# MACWORLD

February 1988 $3.95
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The Macintosh® Magazine

## Upgrading Your Mac

*Monitors, memory, accelerators*

**Macworld Contest: Win the World's Best Software for the Mac**

# Hurry up and

Whether it's a two-page letter or a 100-page report, the whole point of writing is to get to the point. And nothing gets you there faster than Microsoft® Word, Version 3.

*Moving an outline heading moves its associated text. So you can not only organize your thoughts, you can quickly rearrange your words, too.*

That's because Word is not your ordinary word processor. In fact, it's not a word processor at all.

Word is the Macintosh™'s first document processor.

And it's specifically designed to take you from outline to output, without getting you bogged down in details.

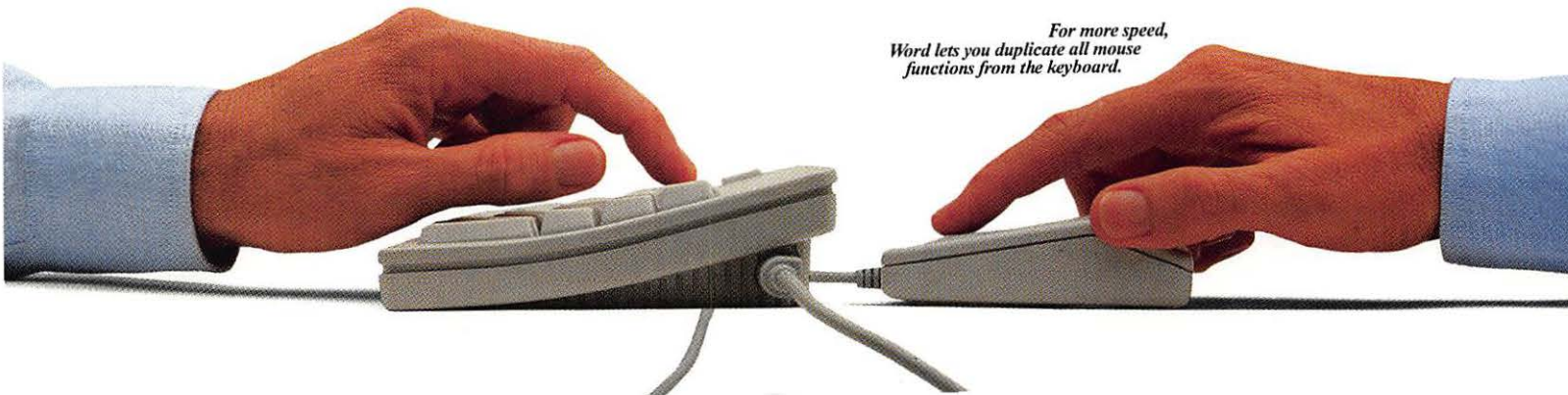
That's why you'll find a combination of powerful features in Word you won't find anywhere else.

Like an integrated outliner for organizing your thoughts. And for rearranging pages of paragraphs with a simple click of the mouse.

Likewise, a simple mouse click is all you need to check and correct your spelling, using Word's built-in, customizable 80,000-word dictionary.

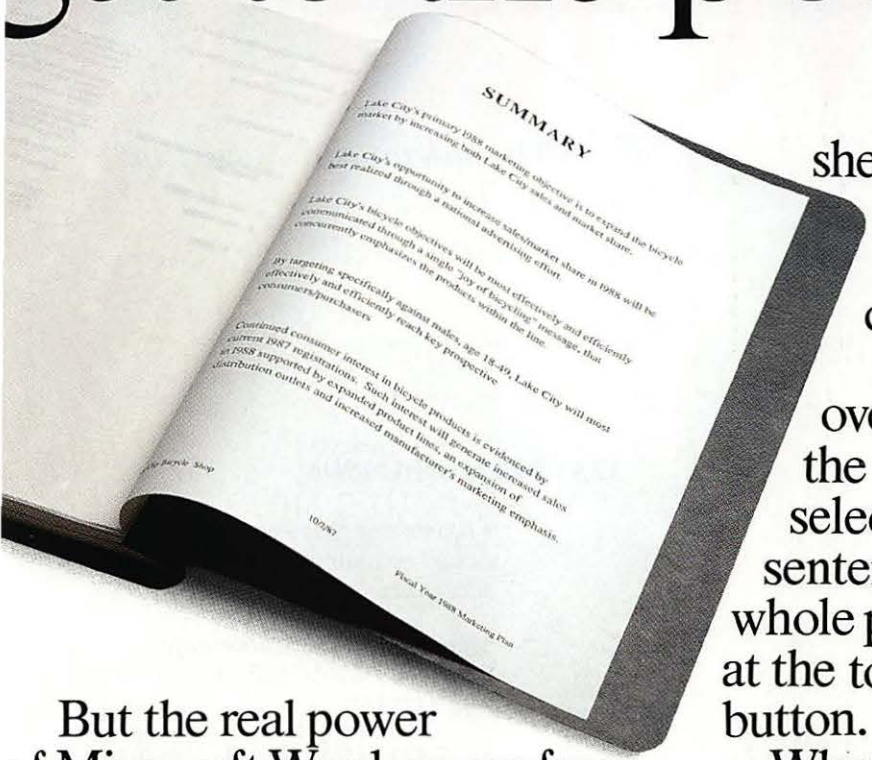
Plus you can preview and adjust page layouts before you print. Customize menus, so the files, fonts and formats you need are always at hand. Even assign Word the time-consuming chore of generating a complete index and table of contents.

All critical, professional features that strip hours off the task of turning rough thoughts into crisp, persuasive documents.



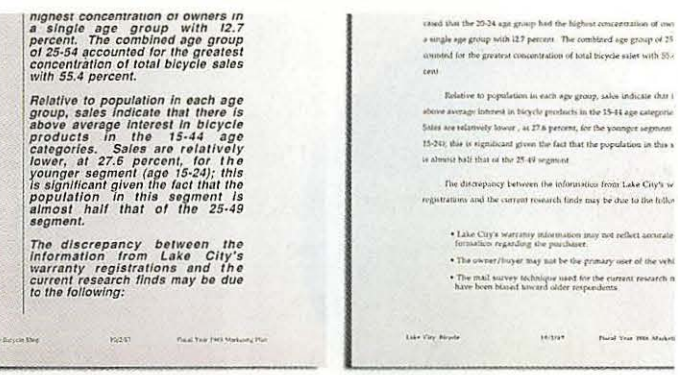
*For more speed, Word lets you duplicate all mouse functions from the keyboard.*

# get to the point.



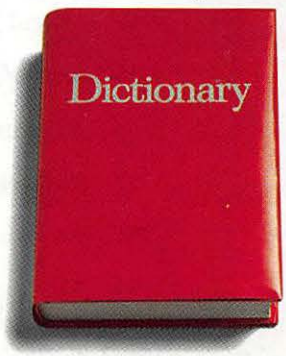

But the real power of Microsoft Word comes from the major time-saving features available while you input, edit and format your work.

Advanced features, like command and accelerator keys, that duplicate every mouse function while you keep your hands on the keyboard. Glossaries, for recalling frequently used text with a few rapid keystrokes. Style sheets, for saving and reusing type styles and formats with a simple point and click.




*With style sheets, you can change from one format to another with just a click of the mouse.*

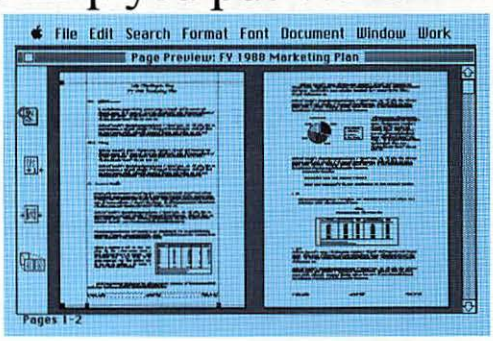
And obvious, but often overlooked time-savers, like the ability to select words, sentences or whole paragraphs at the touch of a button.




*What's the difference between Word's built-in spelling corrector and a secretary with a dictionary? How about a couple of hours.*

What can Word do for you? The answer can be found at your local Microsoft dealer. For the address of one near you call (800) 541-1261, Dept. C77.

Ask him to help you put Word to work in preparing your most complicated documents.




*Page preview saves you endless trips to the printer because you can revise page breaks and margins before you print.*

And in no time at all you'll reach your own conclusions.

# Microsoft® Word

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# MACWORLD

*February 1988*

*The Macintosh® Magazine*


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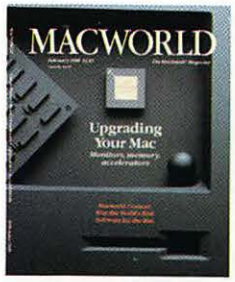
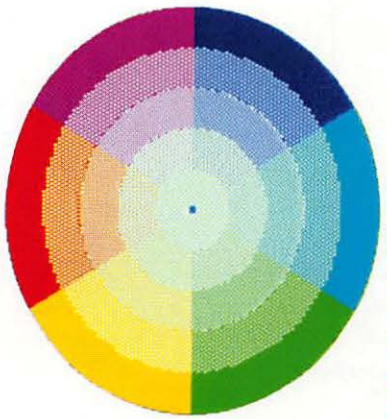



***On the Cover***
*The upgrade path can be a rocky road. The route you pick today may cut off future options. To avoid wrong turns or blind alleys, see p. 136. (Photo by David Bishop.)*

## 123 Macworld News

- *Illustrator Gets Process Color* Color separation finally makes it in *Illustrator '88.*
- *MacProject's New Milestone* Claris announces upgrade as its first major project.
- *FidoNet on the Mac* Be a node in a worldwide network.
- *Power to the People* Profile of a power user.

Plus reports on a possible new engine for Apple printers, new software for fund-raisers, the first internal 2400-baud modem, and more.



*Apple's Color Picker makes adjustments to hue, chroma, and brightness. For a briefing on these and other color concepts, see "Live and in Color" (p. 148).*

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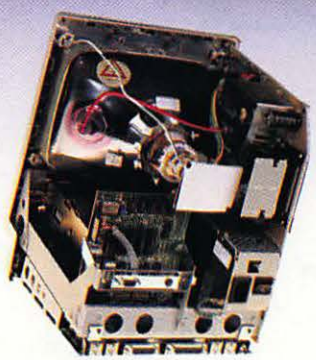

*See p. 136 for the naked truth about upgrades. Extensive data on accelerator boards, memory expansion, SCSI add-ons, cost vs. performance.*

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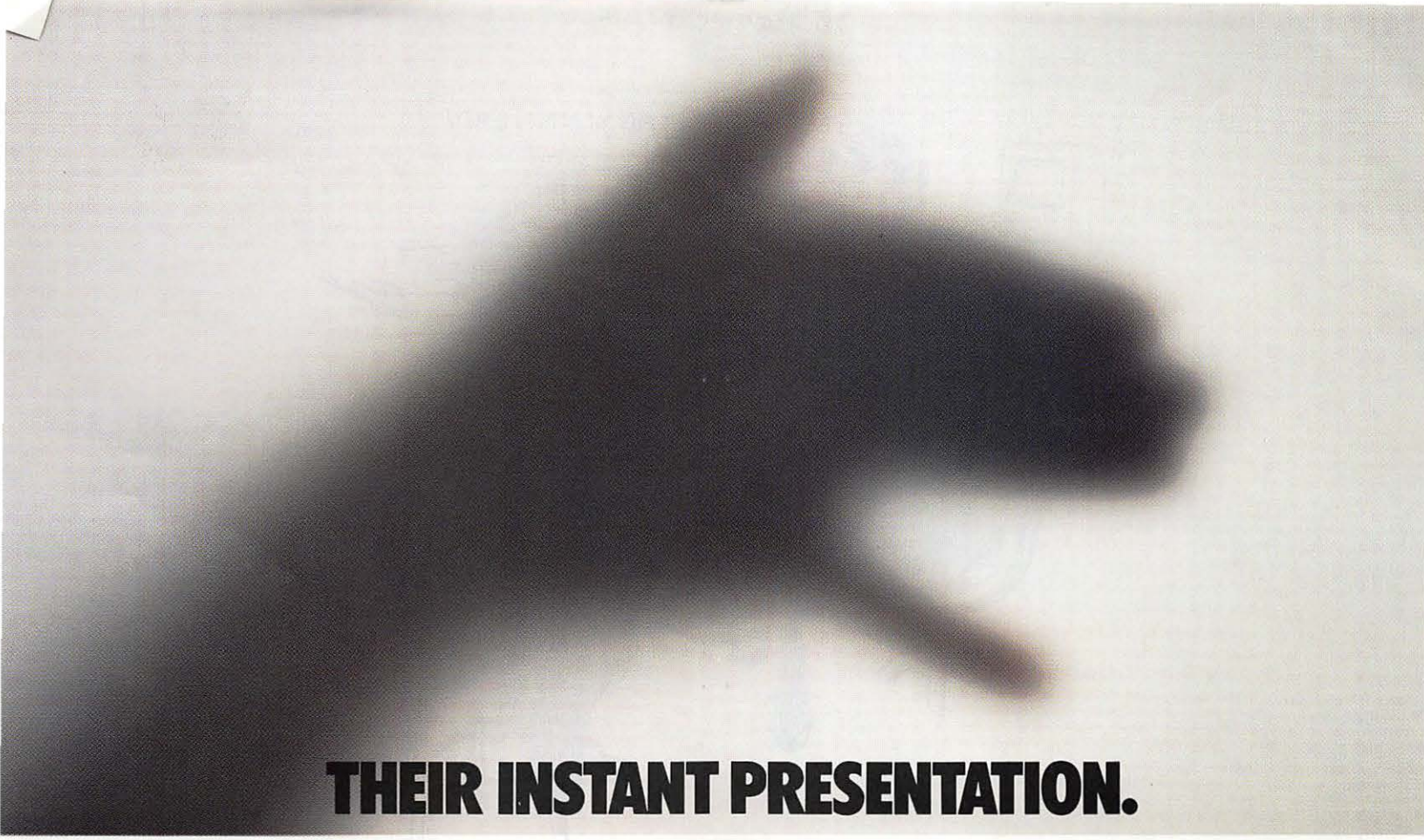

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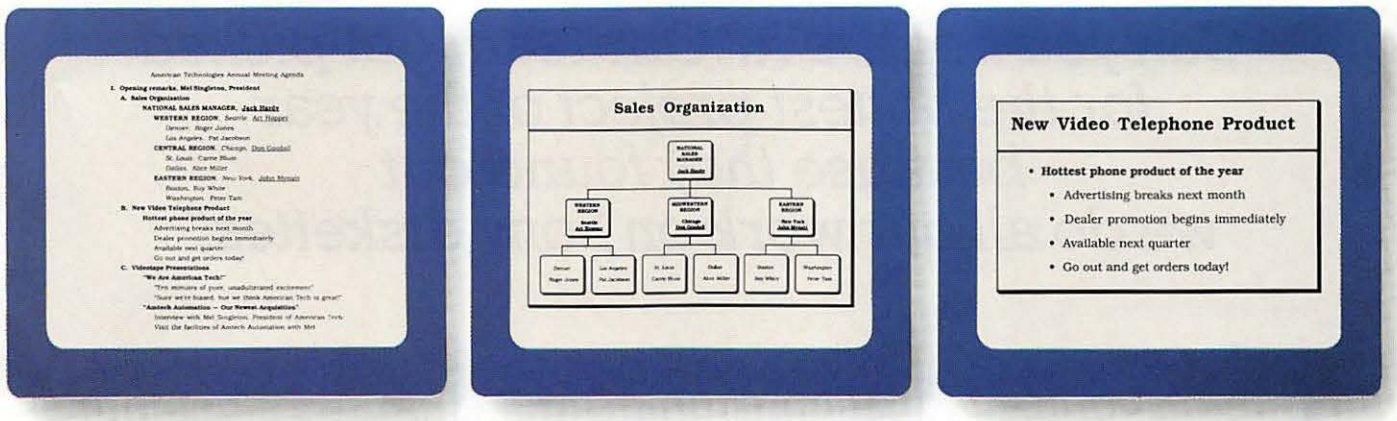


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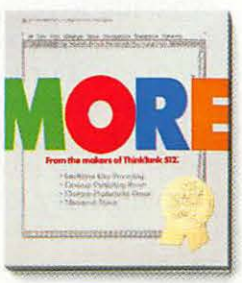


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The fast-moving, fast-thinking people in today's competitive corporate world are the people pushing for the highest standards. For example, Sony diskettes.

People in the know, know that Sony's standards are the very highest. That, after all, is what made Sony a world leader in audio, video and computer magnetic storage media.

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The way to do that is to make sure they're Sony.

Then you'll be in the very best of company.

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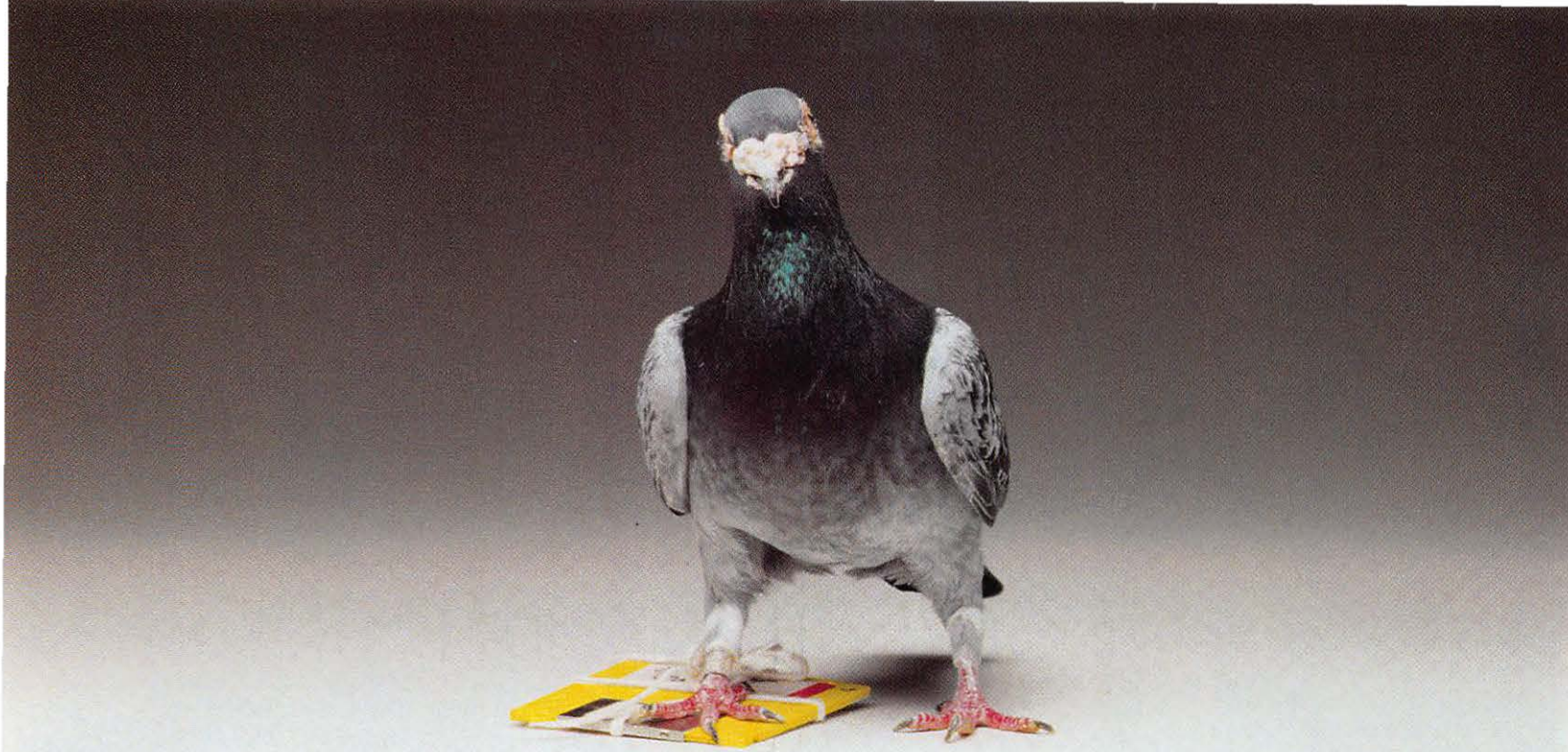
**Circle 210 on reader service card**



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**Circle 96 on reader service card**

# Mac Bulletin

## The Brazilian Mac

Unitron, the São Paulo-based Brazilian hardware developer, is cloning the Macintosh with its MAC 512. If successful, it will be the first computer company in the world to copy Apple's Macintosh.

However, *Macworld*'s South American sister magazine, *Computerworld do Brasil,* reports that the MAC 512 is experiencing some software problems, resulting in production delays and the postponement of a manufacturing license.

Unitron's Macintosh clone is being developed under a Brazilian policy that excludes importation of hardware and software. The controversial policy is designed to promote a Brazilian computer industry. In November 1987, the United States retaliated against this protectionism by raising tariffs on some Brazilian imports.

Whether or not the MAC 512 is released soon, it's certain that the controversy and conflict surrounding its development will continue. Apple, in the Brazilian press, has charged Unitron with pirating both its software and its hardware.

According to Unitron director Geraldo Antunes, the MAC 512 was developed out of reverse engineering, which means Unitron analyzed the Mac and then developed its functional equivalent, not a copy. Antunes claims that Apple's greatest concern is not the MAC 512 itself, but the eight dedicated components that Unitron has developed for the MAC 512.

Although Brazil has closed its doors to foreign microcomputer firms, some Brazilian analysts believe that if Apple were to take the case through the Brazilian legal system, it could, after a lengthy battle, win.

The long-range goals of Unitron include exporting the MAC 512 to Asia, India, and Greece, according to the Brazilian publication *Datanews.*

## Low-Cost PostScript?

Rumor has it that low-cost PostScript printers have reached a new low: $1500. This price is said to be made possible by pairing a Canon laser printer engine with PostScript-compatible software from Western Digital Corporation of Irvine, California. At Comdex, Western Digital demonstrated a preliminary version of its PostScript, which printed both text and graphics. At press time, a final version was expected to be available at January's Macworld Expo.

While $1500 may be an unrealistically low price, if and when this printer reaches the market it should be noted that HP's popular Series II laser printer for MS-DOS computers uses a Canon SX engine (reportedly the same one used in Apple's new LaserWriters) and sells discounted for as low as $1700.

Meanwhile, Apple's Jean-Louis Gassée continues to talk about extending QuickDraw into a full-fledged page-description language, thus largely displacing PostScript. Microsoft's Bill Gates says Apple should come over to the OS/2's Presentation Manager. Adobe responds by saying it's unlikely that anyone will copy both the original PostScript and all its improvements.

Caught in the middle of this controversy are users who wonder if the PostScript-compatible languages will be truly compatible and if they'll require special software drivers for each application–thereby creating a confusing situation at best. The more complicated the PostScript cloning situation becomes, the more it strengthens Adobe's claim that its PostScript is the true standard.

To address this compatibility question, Desktop Publishing Solutions of Farmington, Minnesota, has announced it will evaluate PostScript-compatible software by testing each program's speed, its printing of sample documents, the appearance of its fonts, and its compliance with Adobe's *PostScript Language Reference Manual.*

## HyperCard Audio Training

You know that a product has finally arrived when you can learn about it by listening to an audiocassette in the comfort of your home or car. That's the case with Apple's recently released *HyperCard*–thanks to the efforts of Personal Training Systems (PTS) of San Jose, California.

Known for its self-paced training guides to such popular Macintosh programs as *Excel, Word, PageMaker, Works,* and *More,* PTS now offers *HyperEasy,* a series of four *HyperCard* training packages that cover using *HyperCard,* creating cards and stacks, basic scripting, and advanced scripting–each of which includes an audiocassette, practice disk, and summary card. The first package (Using HyperCard) lists for $39.95, while the other three tutorials cost $49.95 apiece.

## Dramatic Graphics

Picture one of those television commercials in which a program or product name is fragmented into layers. Bringing the pieces together creates a complete picture, with shadows for a 3-D effect.

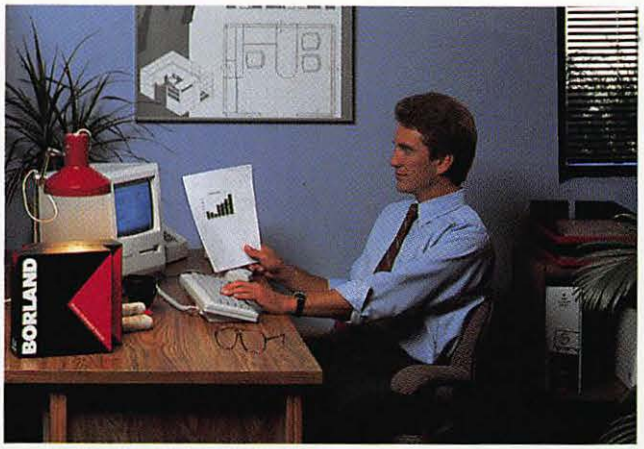
You can create similar graphics on a Mac with a new program called *Visions* from Pear Tree Software of London. You create separate images in a draw program, assemble them into a flat picture, and then save them as a PICT file or copy them to the Scrapbook. You then import this flat image into *Visions,* where you can tilt it forward or back, rotate it, and give it perspective. When you like what you see, you get to *fly* one image above the other using depth controls for different layers.

You can export a finished drawing to the original draw or paint program as a paint or PICT file, or to a page-composition package as encapsu-

*(continues)*

NEW!

# Reflex Plus Turns Disorganized Data Into Useful Information




### *THE INFORMATION TREADMILL*

Dealing with data is an inescapable reality of modern living—at home and on the job. Especially on the job. Most of it is pertinent. Much of it is valuable. And almost all of it would make our lives more productive—if we could just figure out how to make it work for us without a staff of experts inputting, outputting and making all the right connections.

*Dā-ta-bāse:*
"a collection of data organized especially for rapid search and retrieval."

Some people are intimidated by the mere mention of the word "database." Don't fall into the trap. In today's computing world, power is measured by the ability to retrieve, manipulate and evaluate information. A database manager gives you that power.

### *THE FLAT FILE MODEL*

The most elementary form of database manager is the flat file database manager. It allows you to manage lists—like inventories, basic mailing lists, payment records, prospect lists and so on, but its power is limited.

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A relational database manager such as *Reflex® Plus* can manage flat file databases. But its real power comes from the "relational" aspect. It allows you to create multiple flat files, then link and cross-reference records within these files. Oftentimes, the "relationship" established through linking is more important to a user than the original files. Up to now, the most popular relational databases have proven to be cumbersome, hard to learn and difficult to use.

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*Reflex Plus* gives you amazing flexibility in creating databases, accessing data and producing reports. You can organize and sort your data any way you want—on as many fields as you want. You can display it any way you want. You can add graphics, change fonts, add calculated fields—all according to your own design.

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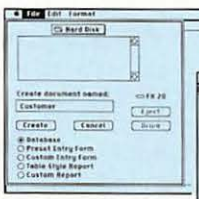
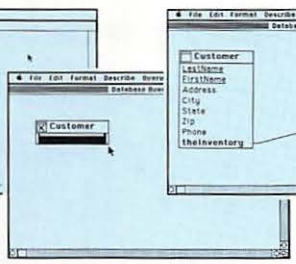
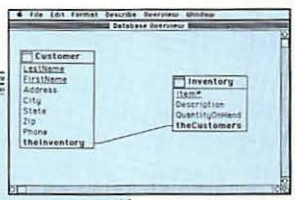
### *HERE'S HOW IT WORKS* (It's as simple as drawing a box.)



*(1) Pull down the File menu and select "New Database File . . ." Enter the name you have chosen. Click on "create."*




*(2) Voila! Your database is on the screen and waiting for you to enter fields.*




*(3) Draw lines between the databases to establish the proper relationship between them. And that's it! You're now ready to enter your data.*

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lated PostScript. *Vision* files can also be opened as working documents in Adobe's *Illustrator.*

As of press time, *Visions* was scheduled to be available for purchase at January's Macworld Expo in San Francisco–at a list price of $199–but no United States distributors had been selected.

## Late Bloomer

▶ Advanced Digital Information Corporation (ADIC), a new Redmond, Washington, company, has entered the Macintosh markets for hard disks, optical disks, and tape backups.

ADIC's offerings include: 109MB, 183MB, 218MB, 244MB, 366MB, and 488MB hard disk systems; 40MB and 134MB tape backups; and one of the very few optical disk storage systems for the Mac. It contains 800MB of write-once, read-many (WORM) memory. ADIC's products work with Macintoshes, IBM PCs, PS/2-compatibles, SCO-Xenix systems, and Novell Netware Systems.

ADIC claims that any of its tape drives can read any cartridge recorded by any ADIC drive of the same model. This means that ADIC's tape-backup systems can read ADIC cartridges at multiple locations and that you can replace damaged drives without losing data.

## Balky IIs

▶ Booting the Macintosh II from a hard disk can be more troublesome than starting up a Mac Plus or an SE because the Parameter RAM (PRAM) has more control over the II's booting characteristics. Inadvertent alteration of any PRAM settings may make it difficult, if not impossible, to start up the II with its hard disk.

To correct this problem, insert a floppy disk with a System folder. Hold down the Shift-⌘-Option keys while opening the II's Control Panel from the Apple menu. This will reset the PRAM to its default settings, allowing the II to come to life once again.

This procedure solves most of the Macintosh II problems brought to CJS Systems of Berkeley, California, a firm specializing in Macintosh hardware repairs and upgrades.

## Pocketing HyperCard

▶ *HyperTalk and the External Commands,* a 65-page publication from Softpress Publishing of Foster City, California, is the first pocket reference to *HyperCard*'s HyperTalk programming language. Contents of the 1987 publication include: Commands, Functions, Control Structures, System Messages, Properties, External Commands and Functions, Constants, and Operators.

Another first from Softpress is *MatchPoint,* a business presentation application using *HyperCard.* It allows you to compose and rearrange slides, specify the type of fade and its duration, and create charts and graphs while maintaining a hot link to the original data. *MatchPoint* is expected to be available by March.

## Full-Size Color

▶ Moniterm's first color monitor, the Viking 10 for the Mac II, features a 19-inch screen that displays 1024 by 768 pixels and 256 colors or shades of gray. Viking 10 gives the same on-screen, 72-pixels-per-inch resolution as the Macintosh Plus or SE so that text or graphics appear full-size; many monitors have images that are only 83 percent of original size, resulting in text that is difficult to read. In addition, the Viking 10 will work with IBM XT/AT machines with a change of video cards, and it weighs only 47 pounds–lighter than many 19-inch color monitors. List price is $4995.

## New Communication Network

▶ *MacNet* is a new communication network with two big differences: it's especially designed for the Macintosh, and it uses icons like those on the Mac's desktop. In addition, *MacNet* provides electronic mail, stock reports, and technical-support hot lines to Macintosh product vendors like Aldus, the developer of *PageMaker.*

If you're familiar with *AppleLink,* you know a lot about *MacNet,* which essentially copied the *AppleLink* interface and then added lots of features: automatic sending and receiving of mail at specified times; automatic updates of domestic financial quotes for stocks, bonds, options, and futures; and private and public bulletin boards, which focus on serving business needs.

The *MacNet* service charges a $39.95 one-time enrollment fee, which includes the special *MacNet* software, plus 100 minutes of free peak-hour connect time and 100 minutes of free nonpeak usage during the first month. Subsequent months are billed at $19.95 for the same amount of time.

*MacNet* bills for additional time at the rate of $9.60 per hour of peak usage and $4.80 for nonpeak usage. There are no additional charges for access through some 480 local-access phone numbers located throughout the United States. The *MacNet* service is offered by Connect of Cupertino, California, at 800/2-MACNET.

## Mail-Order Story Gets Results

▶ In response to *Macworld*'s December exposé, *What's Wrong with Mail Order?,* Icon Review has changed its business practices. Dennis Moncrief, CEO of the firm, told *Macworld* that Icon Review will no longer charge customers before shipping the goods they've ordered by phone or mail. In addition, Icon Review has established a toll-free customer service phone to allow people to inquire about their orders at Icon Review's expense. Moncrief said an infusion of venture capital had enabled his company to update its systems and operations to provide better customer service.

## Your Best Stacks

▶ Send a disk of your best *HyperCard* stacks to: News Editor, *Macworld,* 501 Second St., San Francisco, CA 94107. We'll pay $25 for every entry selected for a new monthly item, "Your Best Stacks." Please tell us how you developed your stack, describe its features and who would use it, and let us know how readers can obtain more information. We'll also need to know if it's free, shareware, or a commercial product. □

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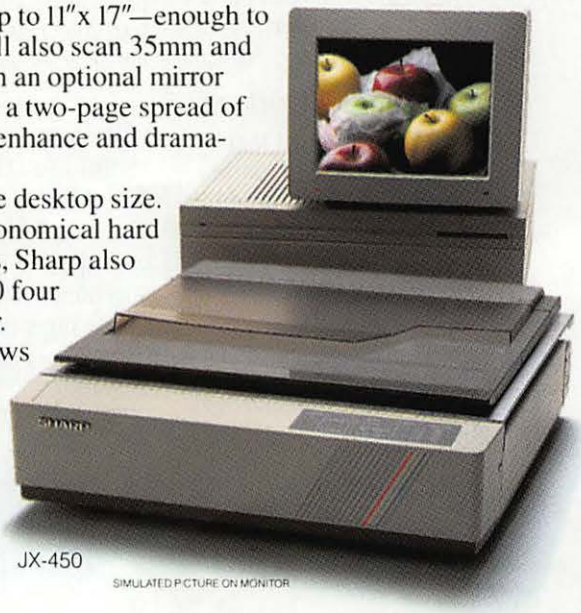


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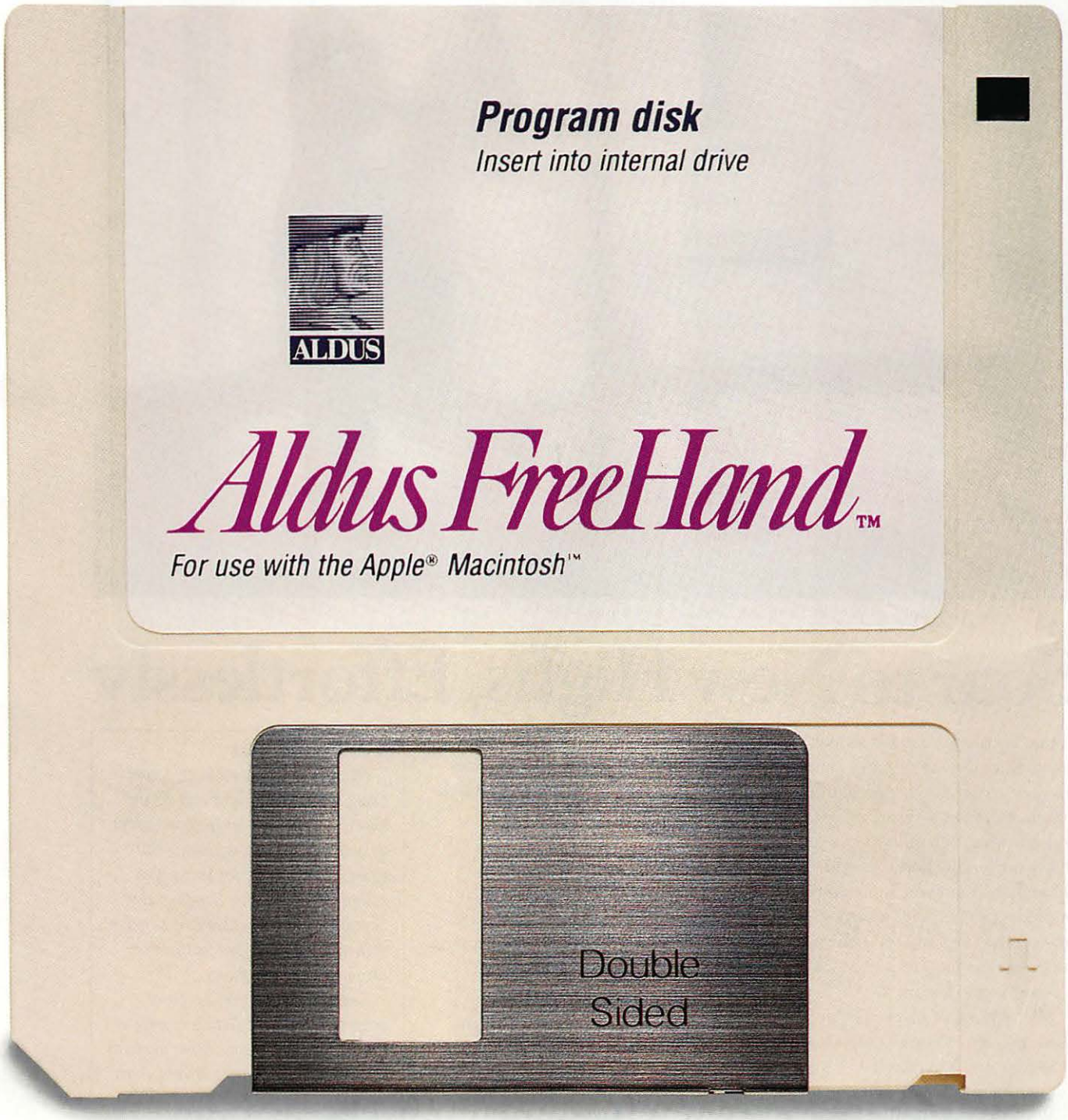


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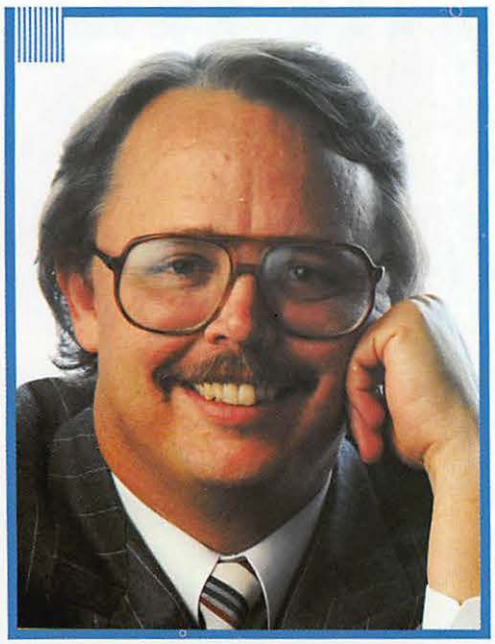
# Sushi, American Style



*How do we prevent Japan, Inc., from eating our sushi? Jean-Louis Gassée provides a menu of possibilities.*

I recently heard Jean-Louis Gassée, Apple's senior vice president of research and development, give a talk at a meeting of the World Affairs Council in Santa Clara, California. He was blunt: "How do we prevent Japan, Inc., from eating our sushi?" he asked.

Gassée wasn't referring to the American trade deficit with Japan. Neither was he alluding to the United States personal computer industry's seemingly insatiable appetite for raw semiconductors, especially those of the 256-kilobit DRAM and the 1-megabit RAM variety.

Nor was he particularly concerned about the flood of Japanese PCs, floppies, disk drives, printers, and other peripherals into this country.

By *sushi,* Gassée meant American processor architectures and systems software.

"They are our industry's most protective weapons," he warned. "I wonder if we are fully evaluating the consequences of handing them over to Japan, Inc."

Gassée was quick to acknowledge Apple's dependence on things Japanese. Specifically, Apple relies on the Toshiba Corporation for its ImageWriter printer parts. Apple stands to lose a lot as a result of the proposed United States boycott of Toshiba products, a step the Senate is considering in retaliation for that company's sale of high-tech submarine equipment to the Soviet Union.

For the record, Gassée is not a protectionist. "Protectionism will not work," he said. "It is stealing from customers to feed inefficient companies." Furthermore, he wisely advocates keeping politicians out of the trade dispute.

Rather, I would characterize Gassée and Apple as "preventionists." This is a much more subtle philosophy than protectionism, in my opinion. Preventionism allows us to leave the trade door open—while we rely on an alarm system set to go off when danger comes too close for trade comfort.

Gassée believes that history is about to repeat itself—that the Japanese are in training to dominate the personal computer market in the United States.

"The question is not if, but when," he said. Japan has already achieved dominance "from disk drives to printers, from VCRs to displays, from CDs to floppies."

"Japanese industry has been very successful in securing a strong market position. One of our noteworthy competitors even lost dominance of its own standard to clones," he reminded us, referring to IBM.

Gassée observed, however, that the crucial difference between PCs and CD players is that the Japanese *can* satisfy customers worldwide with CDs, since that software is universal. "Bach, the Beatles, and Michael Jackson are not tied into the local language," he said.

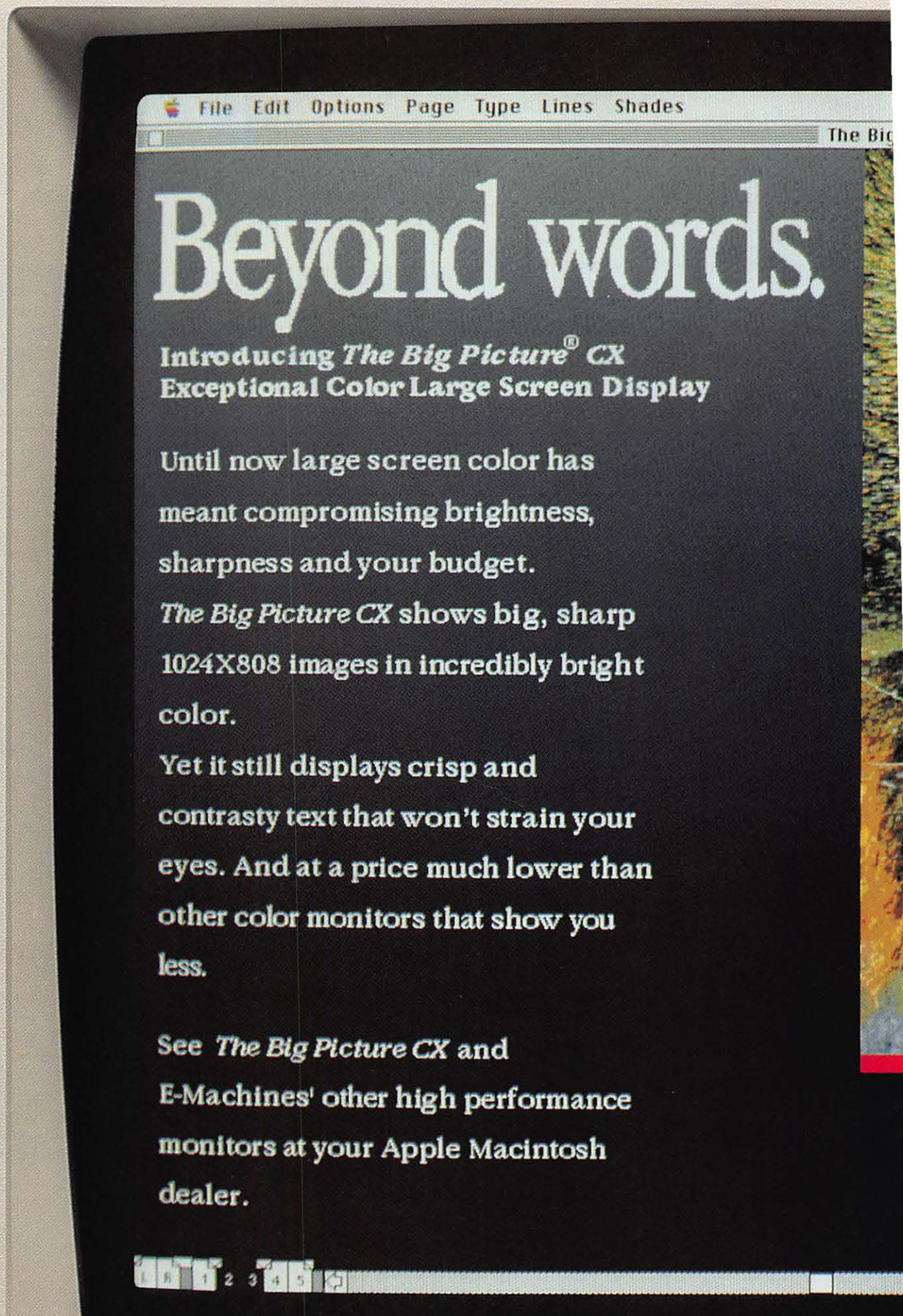
Computer software, however, must originate in or be translated into a native tongue before it can achieve market share. In Japan this is agonizingly difficult because the Japanese language has thousands of characters. For this reason, the personal computer hasn't been nearly as successful in Japan as in the United States.

Gassée rightly believes that it would be impossible for the Japanese to successfully market personal computers in the United States if they had to base them on their own processor architecture and operating system. It is only when we give them access to our proprietary knowledge that they can compete. Japanese hardware based on Intel processors and Microsoft software can easily eat IBM's lunch.

Gassée sees the PC workstation market as going the MS-DOS route, especially with Fujitsu's recent acquisition of Sun Microsystems' RISC architecture. "I think it is a bona fide mistake to trade long-term interests for short-term business," he said. "It's a terrible mistake. I wish it had never happened."

And, he continued, "Free-licensing systems to all comers is the moral equivalent of handing the crown jewels over to

*(continues)*

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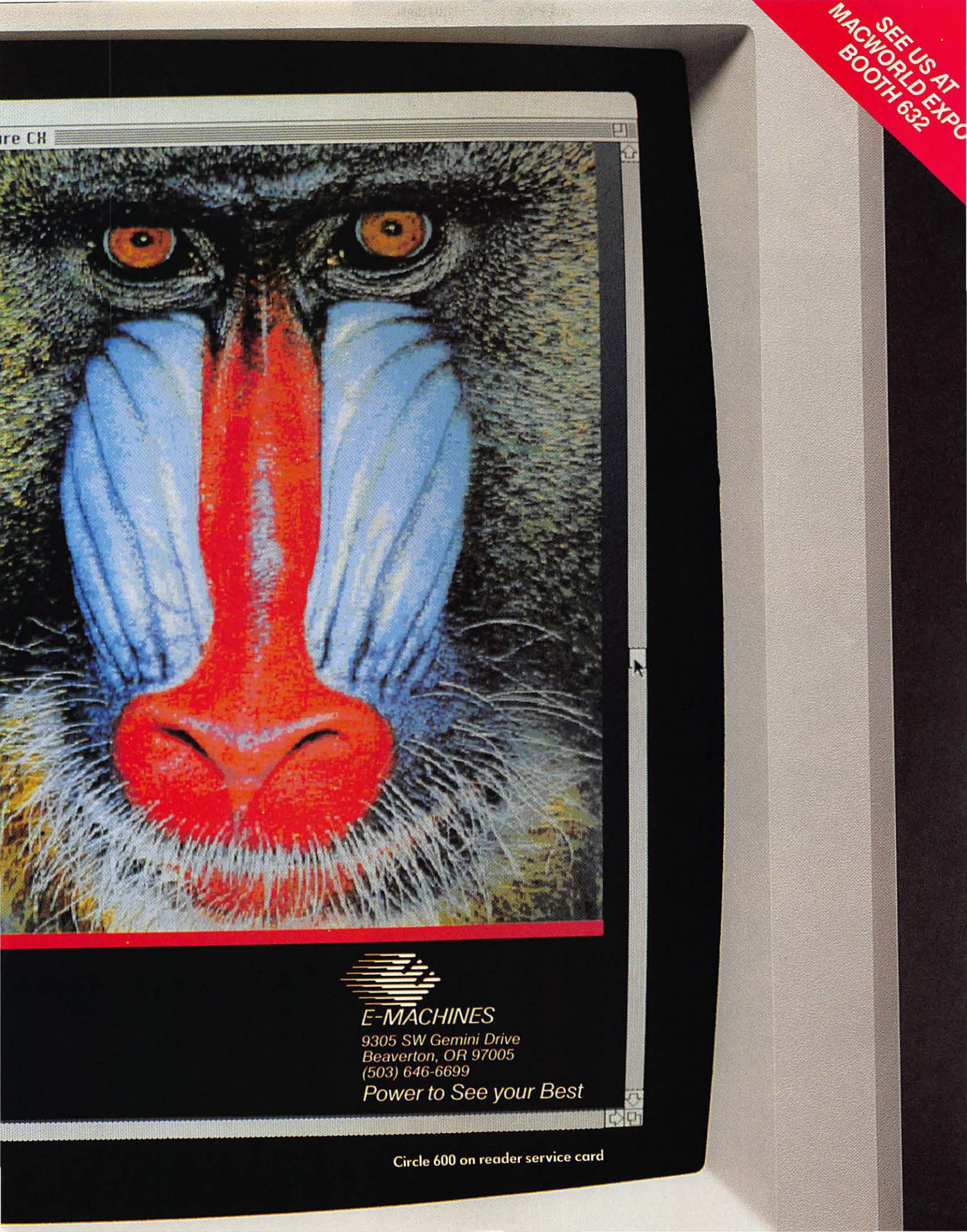
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**David Bunnell**

enemy forces. Lenin used to say that capitalists would sell the rope that would hang them."

Gassée noted that Apple is currently the only personal computer company that owns its system software. And he lauded Digital Equipment Corporation for holding the fort on the minicomputer front.

"Where would DEC be if it licensed to all comers the VAX processor architecture and the VMS? Perhaps we would have cheaper but less capable VAX systems–cheaper because they would be made somewhere else, but less capable because, by lowering its profit margins, DEC would have fewer dollars for R&D to upgrade and enhance the systems."

According to Gassée, the PC industry today is about to give Japan, Inc., access to the equivalent of DEC's VAX architecture. And although I like to think of the planet as one big economy, I think he has a point. Why should American companies leave themselves so vulnerable to this kind of financial attack? Maybe if we were a little smarter, and focused more on product categories, the subject of protectionism wouldn't even need to be discussed.

You could ask, who are we trying to protect anyway, American companies like Apple and IBM–or the American consumer? One of the most positive results of the flood of PC clones from Japan and Korea and Taiwan is that we actually have better PCs at lower prices. The availability of PCs to individuals and to businesses is much greater now than it would have been if IBM had kept its operating system proprietary.

Furthermore, as I've noted in this column before, the fact that Apple will not share its operating system means that the Macintosh does not have the huge installed base that MS-DOS machines have. Ultimately, the danger to Apple is that, as MS-DOS machines proliferate, software developers might abandon the Mac market and move on to more lucrative territory.

If Apple were willing to share its technology, we would have lower-priced Macs, but over the long run we might not have a healthy Apple Computer inventing new great products.

I'm against protectionism, period. Whether we're protecting commodities, manufactured products, or intellectual property, we get nothing but trouble in the end.

The world is one single organic entity, with all of its economies linked together. I

*(continues)*

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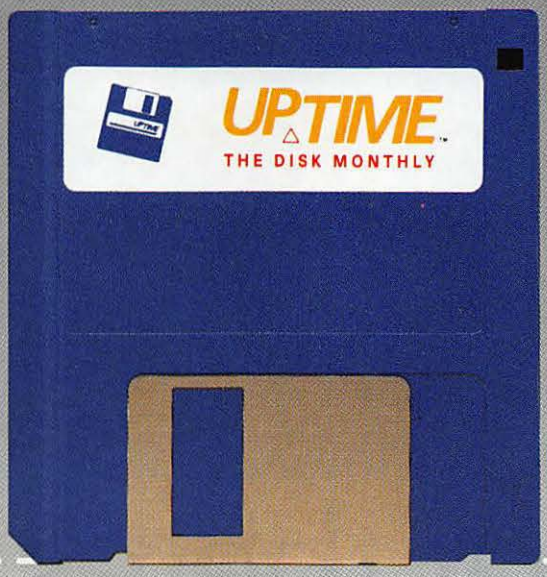


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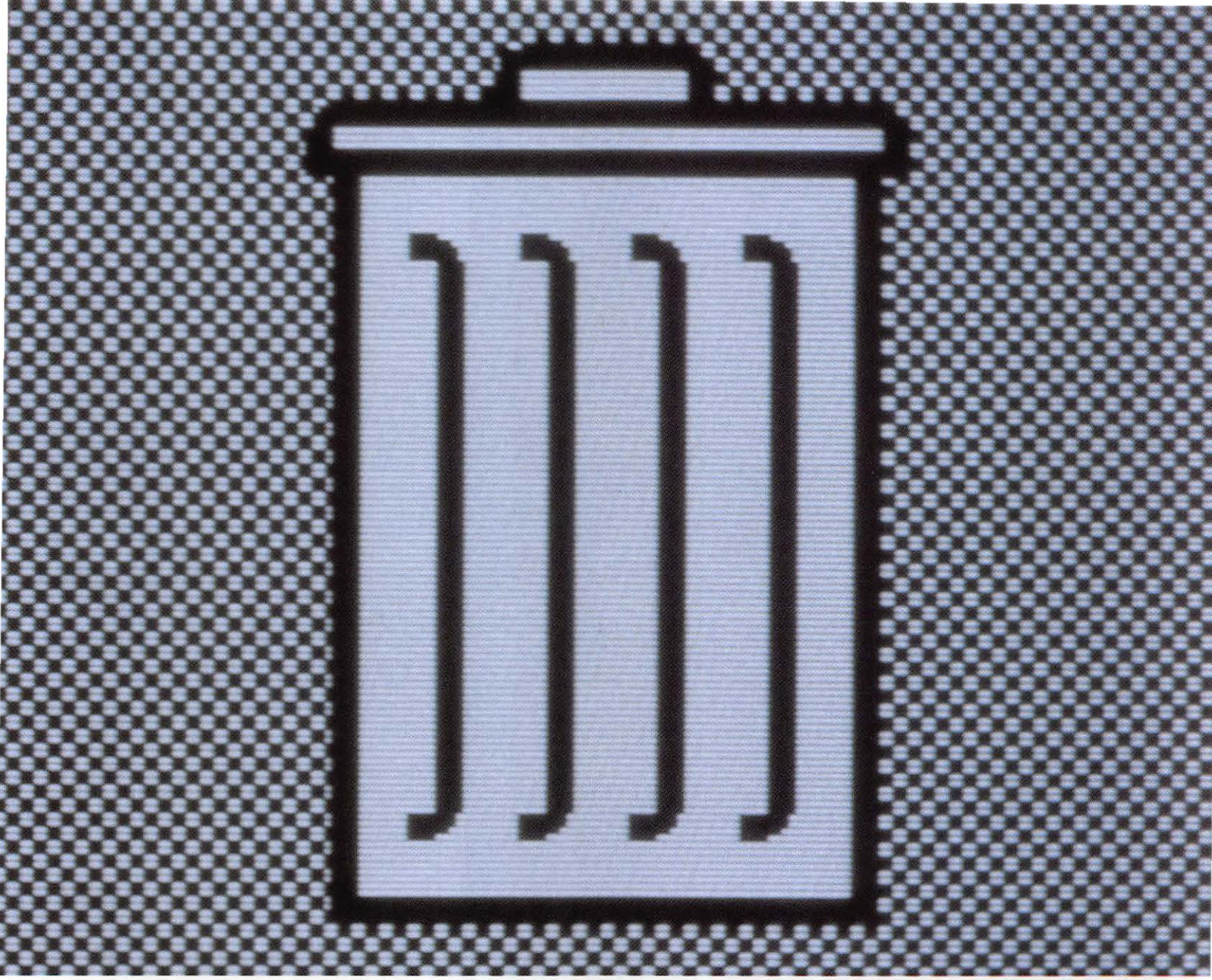

# for the Macintosh, you can ainframe links in their place

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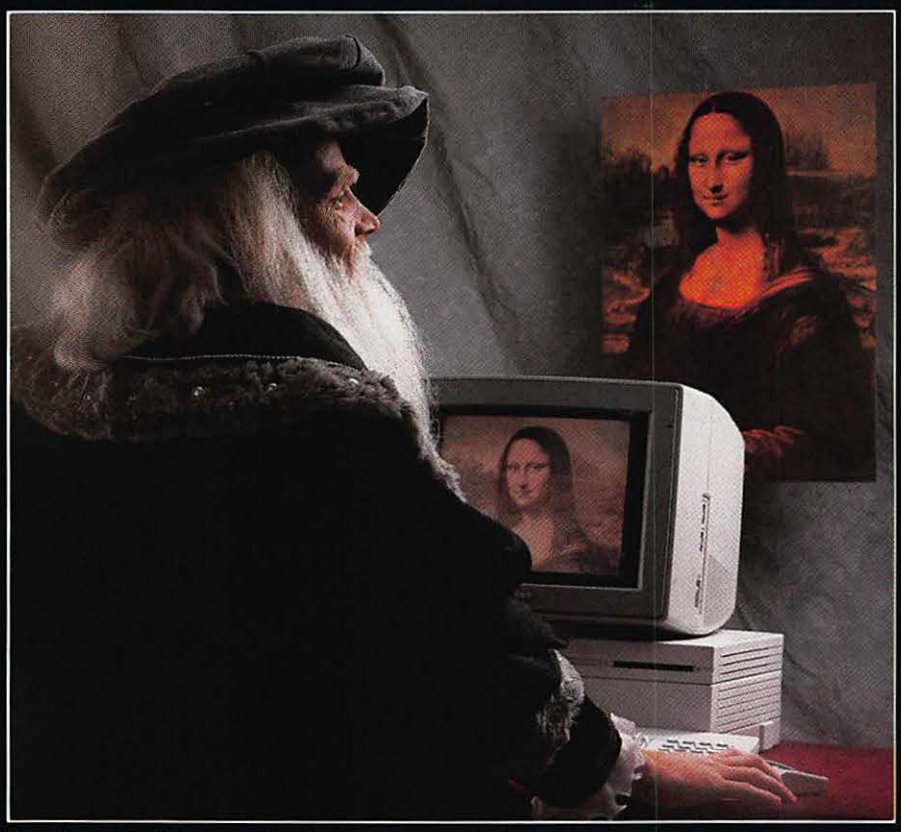

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**David Bunnell**

think last October's stock market crash reminded us of how true that is. When the American market went down, the market also dropped in London, Tokyo, Sydney, Hong Kong. When it went back up here, the other markets followed. We're all in this together.

Japan–and now Korea, Taiwan, Hong Kong, and Singapore–has learned to operate effectively in the world market. This has brought a wealth of products to consumers at very competitive prices.

We should applaud the marketing achievements of those countries. Remember, too, America has been the leader in creating a worldwide economic system from which all those nations benefit. In particular, the entrepreneurial Asian nations have learned how to listen to customers, how to design advanced products, how to be more efficient, how to automate.

But let's admit it: America has also benefited from the Asian success story. The low price of Japanese memory chips has helped to create the personal computer market. We have increasingly powerful computers with more memory at affordable prices. Even as other products have gone up in price, computers have come down.

I'm worried about the protectionist trade bills pending in Congress. They seek to protect American industries. They may save some jobs, though the Japanese are fast becoming major employers in this country.

What are those trade bills really advocating–that we go back to an era of shoddy workmanship and production inefficiency? Why? Because we have one of the highest-paid workforces in the world? A workforce that is reluctant to embrace more technology because it threatens jobs?

A false argument underlies these questions. Look at Japan. Its labor costs now are higher than those of other industrialized nations in Asia. So cheap labor is definitely not the only way of retaining an economic advantage.

It's clear that consumers are willing to pay more for better products–for efficiency, automation, and marketing savvy. Take semiconductors, for example. Faced with pressure from the American semiconductor industry, the United States forced Japan to impose limits on the production and export prices of chips. Unpredictably, Japanese chip-manufacturers have come to

*(continues)*

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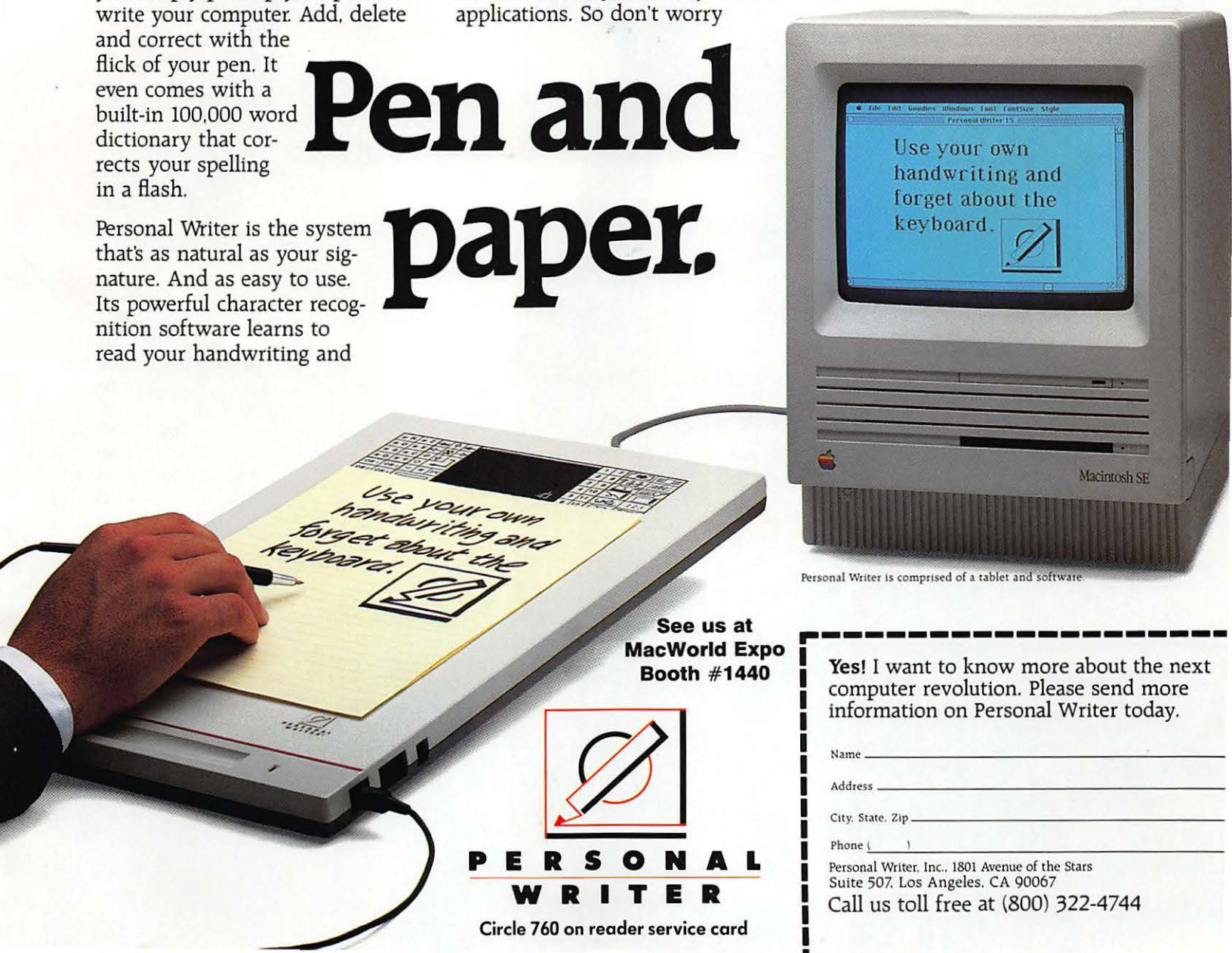


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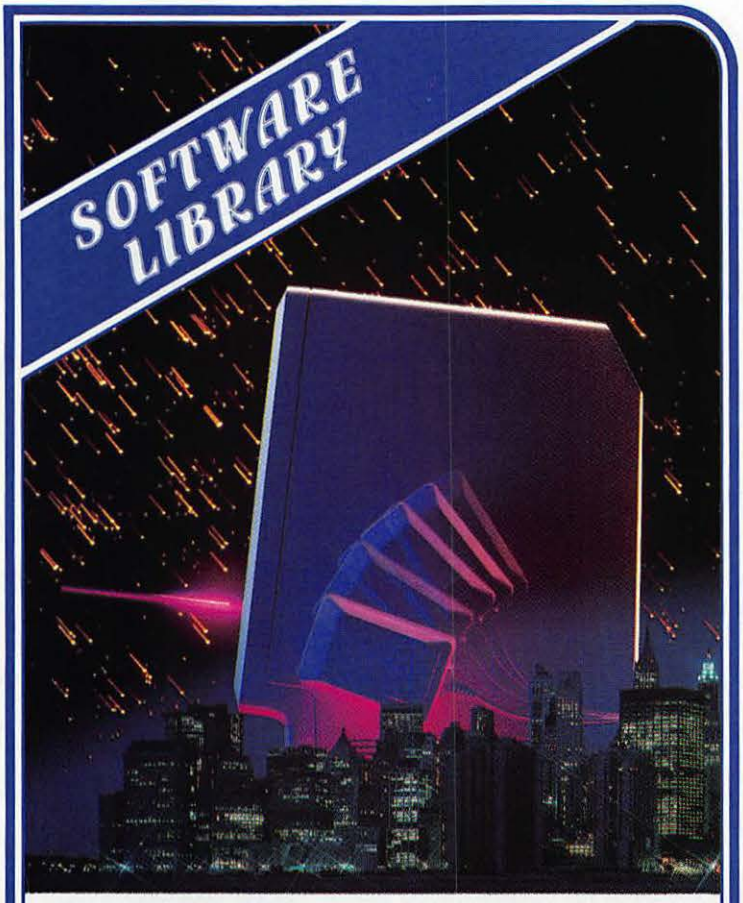


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love the controversial semiconductor pact, which was signed in September 1986.

Prior to the agreement, Japanese manufacturers were selling their chips at bargain-basement prices. The competition was brutal, and no one was making any money. Now, with Japan's Ministry of Trade and Industry telling manufacturers how much they can produce and what the market price is, Japan's chip makers don't have to worry about overproduction cutting down their profits.

The pact created a situation parallel to that of Japan's automobile industry. Japanese car-makers had to voluntarily restrict their exports to the United States. That gave them the opportunity to shift their product lines from low-cost models to luxury cars with a higher profit margin. The Japanese chip-makers are doing exactly the same thing, by concentrating on high-end chips like the 256-kilobit DRAM and the 1-megabit RAM.

As a result, we are seeing a real seller's market. Not only that, but like Toyota and Honda, Japan's chip makers are opening manufacturing plants in the States. We're going to be buying American-made chips from the Japanese soon.

How can we move the game back onto our turf?

We have to relearn the standards of excellence that used to be the hallmark of American-made goods. Despite Gassée's worry about losing our competitive edge, we still have the best scientific and technical minds in the world.

The Japanese still have a few disadvantages. For one thing, they lack the technostructure–the university facilities and research institutes that have given us our lead in research and development.

Another drawback for them is that they must train the managers and technicians who will engineer much of Asia's economic growth. Japanese universities have far fewer foreign students then do American universities. Consequently, they lack a truly cosmopolitan environment where the Japanese and other Asians can learn from each other. And the Japanese have produced only a handful of Nobel Prize winners in the sciences since 1950.

But Gassée is right to worry. If America can't stay competitive in the personal computer business, it will be in danger of becoming a second-rate country. His thoughts about protecting our crown jewels make a lot of sense. Maybe it will take a Frenchman to show Americans just how naive we can be. □

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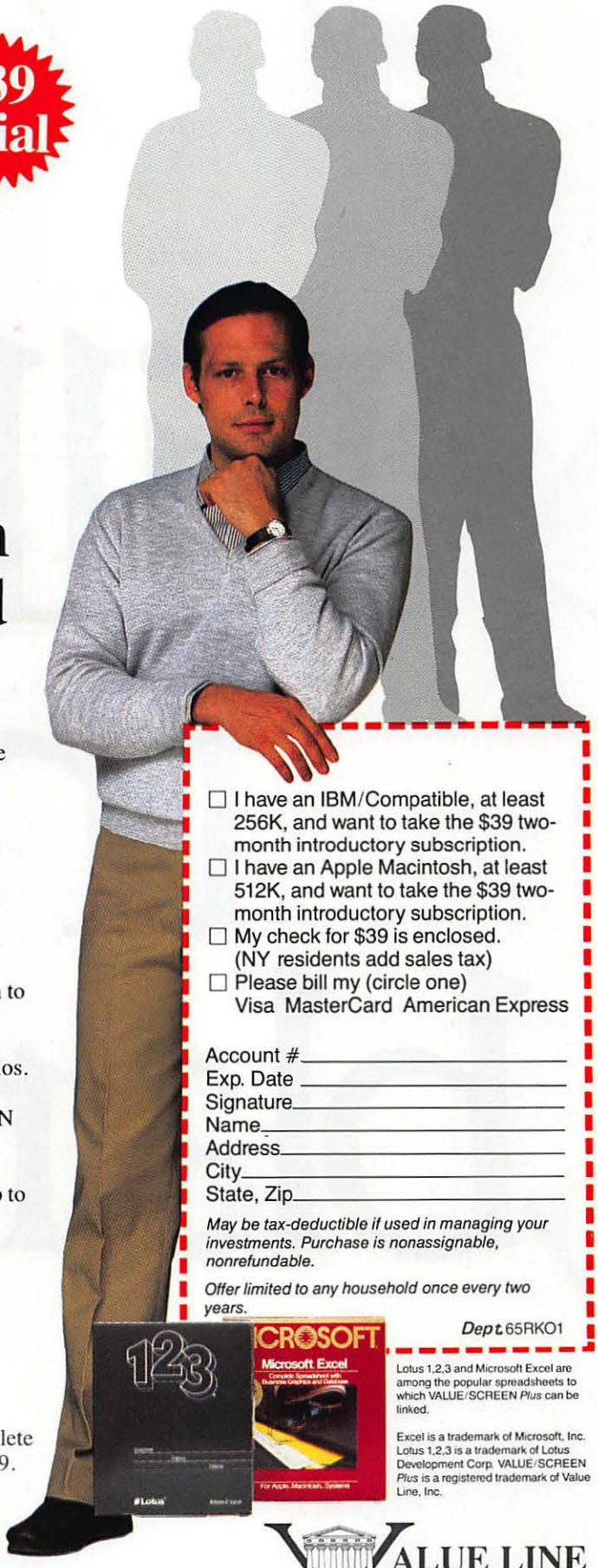

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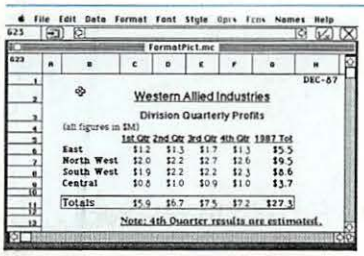


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# Letters

## *A forum for Macworld readers*

**Till Death Do Us Part**
I'm a twelve-year-old considering buying a Mac I can use for the rest of my life. I did some research, but I'm lost. Cards, floppy disks, hard disks, printers, modems, memory, MB—what does it all mean? Should I get a 512K, a Plus, an SE, or a Mac II?

*Nicholas Corman*
*New York, New York*

*Some good questions, although at the rate computer technology is changing, it's hard to imagine any computer system—even the Mac—lasting a lifetime. But if you want firsthand information on how people are using Macs right now, why not check out a local user group? Those in your area include Laser Board (212/831-6413) and NYMUG (212/691-0496).—Ed.*

DAVID POVILAITIS

**Corrections**
*The photo shown in "MIDI Standard Proposed"* (Macworld News, *November 1987, p. 97) was of Opcode Systems' Dave Oppenheim.*

*Levco's TransLink accelerator boards are $1995 for the SE and $2495 for the Mac II ("Business Buyer's Guide," November 1987, p. 238).*

*Column headings for the "Cooling Tools" table ("Mac System Tools," November 1987) should read (left to right) Mac without Fan, MacFan, Fanny Mac, System Saver Mac, Mac'N'Frost, and MacChimney.*

*Victor Anastasia, whose photo appears in "Benchmark: Mechanical CAD" (November 1987, p. 117), uses PC-compatible* AutoCAD *on an IBM PC AT, not on a Mac.*

*Phone numbers for ProApp, maker of the EyeSaver monitor* (New Products, *December 1987), are 619/931-6922, 800/225-6442, and 800/843-0426 in California.*

**Juggling Finders**
In "MultiFinder: The Application Juggler" (October 1987), Lon Poole calls MultiFinder part of the new Finder 6.0. Actually, it's independent software that can run with the Finder or a Finder alternative. With the Finder's Set Startup dialog box, you can make MultiFinder the start-up "application" and set other applications and DAs for automatic start-up by recording them in a special file in the System Folder.

Users confusing the Finder with the System prompted Apple to adopt a new numbering scheme for its system software [System Tools 5.0 contains System 4.2, Finder 6.0, and MultiFinder 1.0, as well as a number of other system files], but the name MultiFinder is bound to perpetuate the confusion. I prefer the original name: Juggler. It doesn't imply that users are forced to choose between Finder alternatives and multitasking.

*Steve Brecher*
*Software Supply*
*Sunnyvale, California*

**Ethical Disclosures**
Along with David Bunnell's column criticizing journalistic ethics in computer publications ("Benchmarking Ethics"), the October 1987 issue also contains an article by Danny Goodman ("The Two Faces of HyperCard") that mentions Goodman's own *HyperCard* product, *Business Class,* without disclosing his authorship. Is this an example of "shenanigans going on in the name of greed and self-interest?"

*Brian A. Bauer*
*Somerville, Massachusetts*

**A Lapse from Grace**
I was pleased to see David Bunnell advocate a strict code of ethics in computer

*(continues)*

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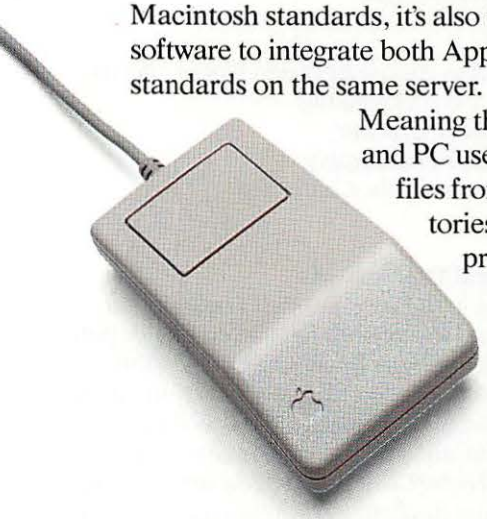

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*PC Tech Journal (August 1987) showed that 49.7% of readers who responded to a questionnaire felt that Macintoshes would be of importance to their companies in the future.

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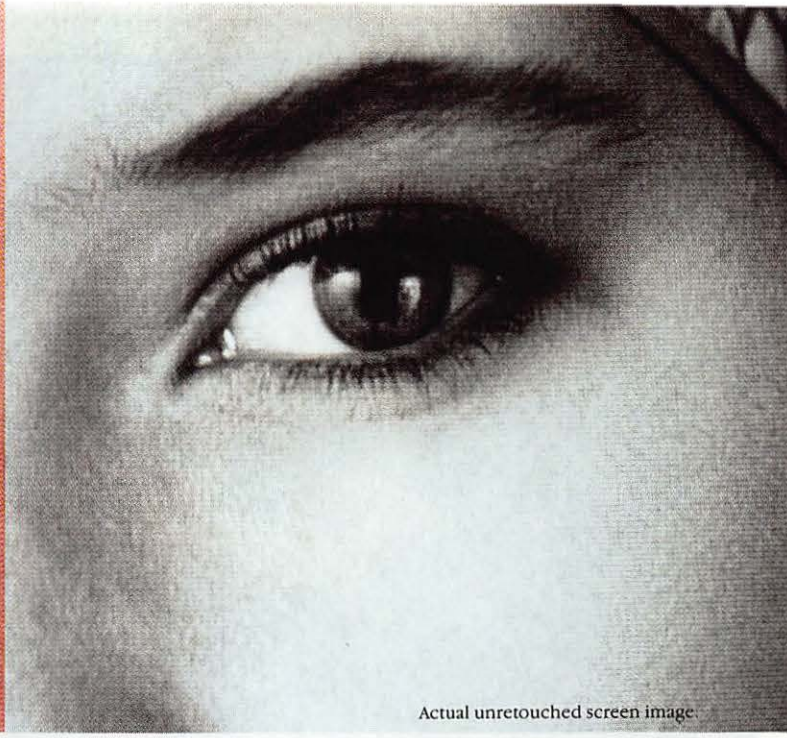
Actual unretouched screen image.



Actual unretouched screen image.

# Screen stars with The Visible Edge.

What gives Princeton's new generation of screen stars the Visible Edge is a screen image of incomparable clarity and resolution. Where brilliant colors and infinite shades of gray, with striking contrast and dimension, are commonplace.

The versatility of the Princeton family of monitors gives the new generation (and present generation) of computers, the greatest autosynchronous horizontal/vertical scan range combination available (ULTRASYNC and MAX-15). The clarity of .28mm dot pitch (ULTRASYNC and PSC-28). 1024x750 display resolution (MAX-15). And the entire spectrum of color, with the ease and comfort that can only accompany an ergonomically designed monitor.

Experience a world of unlimited vision. And the technology that's made our high level of quality, service, value and performance, second nature. Experience the Visible Edge. And see what we do best. For more information call (609) 683-1660 Ext. 110.

IBM PS/2 COMPATIBLE

IBM PC/XT/AT & PS/2 Macintosh II COMPATIBLE

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GRAPHIC SYSTEMS
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NOW AVAILABLE FOR ULTRASYNC:
AC-100 DATA CABLE FOR MAC II

**Circle 656 on reader service card**

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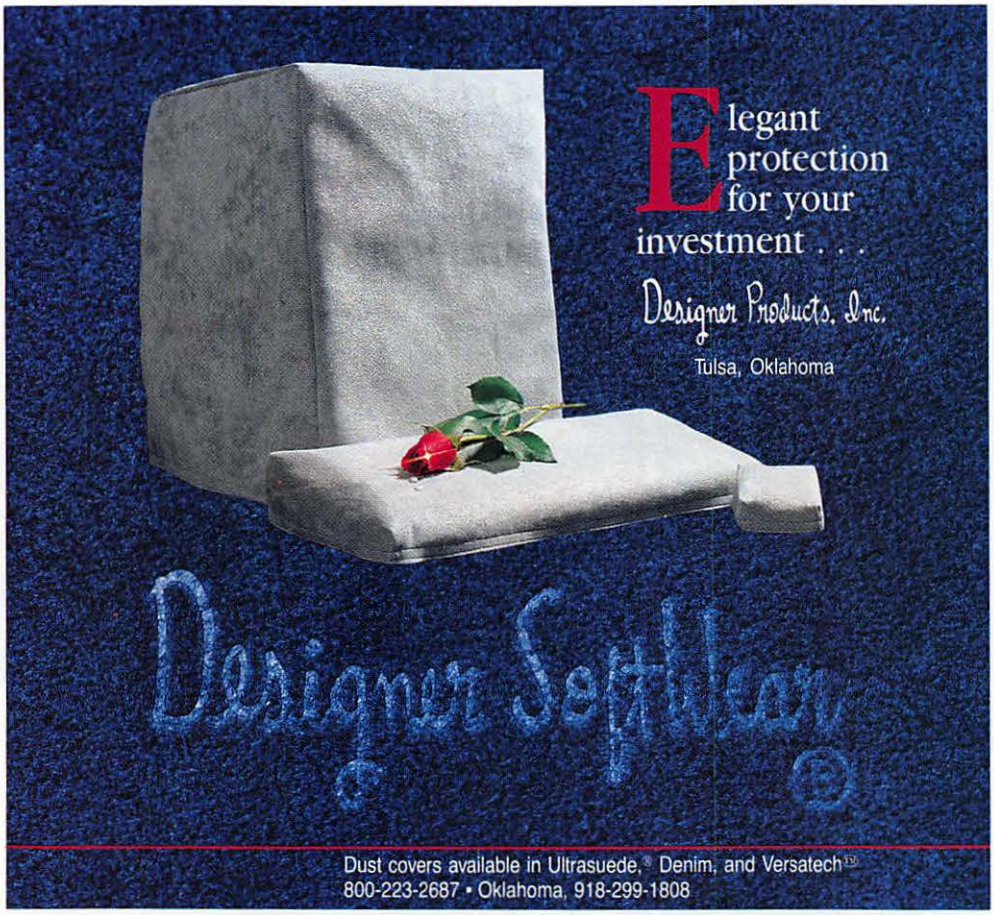


Circle 443 on reader service card

HFS compatible including hard disks!

# Solve Mac problems like an expert!

"1st Aid Kit™ falls into that special category of 'must-have' products" (*MACazine*, April '87). It lets you handle every Mac problem from difficulties copying files, printing, and using AppleTalk networks, to recovering lost data from deleted or damaged files and unreadable disks.

Acclaimed by novice and expert alike, the 1st Aid Kit is much more than powerful software. At its core is a clearly written reference manual that:

- lists every imaginable error condition
- helps you quickly track down solutions to any problem
- takes you step-by-step through each recovery effort
- shows you how to avoid problems

"The definitive product for troubleshooting on the Macintosh™" (*Macworld*, April '87). It "stand[s] head and shoulders above any other product like it . . . I can't recommend 1st Aid Kit strongly enough" (*MACazine*, April '87).

**1st Aid Kit** $99.95

HFS Version: MacPlus, Mac SE, Mac II
MFS Version: 128KMac, 512K Mac, MacXL

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Circle 628 on reader service card

## Letters

journalism ("Benchmarking Ethics"), yet a line in his July 1987 column, "Duel of the Desktops," bears more than a passing resemblance to one that appeared in our newsletter, *microPublishing Report*, last April: "It is curious that IBM has announced a genuine me-too product after years of dismissing Apple's approach to computer design as some sort of affectation."

Is it your policy to attribute such material to the original source?

*James Cavuoto*
*Torrance, California*

*David Bunnell replies: "I do recall reading your newsletter, and it had a great impact on me. I'm afraid I unconsciously paraphrased that statement when I wrote my column a day or two later. It was not deliberate, but I'm sorry it happened." –Ed.*

### The Clock Stops Here

I have just found the worst documentation ever written for a Macintosh product. Every step is incorrect.

I'm referring to the *Macworld* clock I received with my subscription. The labels on its two buttons appear to have been switched, so each one's instructions actually describe the opposite button.

Haven't you violated some Macintosh standard?

*Phil Straus*
*Philadelphia, Pennsylvania*

*We may have violated a Macintosh standard, but we've upheld an age-old tradition that magazine promotional premiums must conform to a certain level of quality.–Ed.*

### A Left-Hand Turn

I'm a left-hander who's decided not to upgrade from a Plus to an SE. The reason? The SE keyboard. I find the Plus keyboard highly functional, especially the optional data pad. But the new keyboards with their numeric keys on the wrong side just don't feel right to lefties. Apple should consider making a keyboard for "the rest of us."

*Gerald B. Hughes*
*Flagstaff, Arizona*

*DataDesk International of Van Nuys, California (800/826-5398, 800/592-9602 in California), markets a keyboard*

*(continues)*

# The Promise of HyperCard: *Focal Point* Delivers.

***There's been a lot of talk about the promise of HyperCard.***™ A lot of—well, *hype.* But not a lot of clear answers to the question "What can it do for me?" ***Introducing* Focal Point,**™ ***the Ultimate Organizer.*** It's got everything you need for managing your time and tasks. Whether you work for yourself or for a large company, *Focal Point* helps you keep your projects on time and on budget. It tracks what you have scheduled tomorrow and what you got done today. It records everything from expenses to exciting ideas. It makes you more efficient, more effective, more creative. And *Focal Point* is completely customizable, so it works the way you do. ***Hot Links.*** HyperCard *links* the *Focal Point* tools to each other. So you enter information just once. But you can organize it and use it in thousands of different ways. Your daily and monthly calendars are linked to your to-do lists, which are connected to your phone directory and call-logging system. Proposal, project, and deadline functions share data with customer and vendor records. The list of links goes on and on. *Focal Point* even has a document launcher that connects you directly to your reports, letters, spreadsheets, whatever. So you can switch back and forth between *Focal Point* and other applications, instantly. ***By the Guy Who Wrote the Book on HyperCard.*** *Focal Point* was created by the man who wrote the book on HyperCard—Danny Goodman, author of the best-selling *Complete HyperCard Handbook.* Because Danny worked with Bill Atkinson on the development of HyperCard, he knows it inside out. So *Focal Point* really shows—and uses—the power of HyperCard. ***Put the Power of HyperCard to Work for You.*** Ask your retailer for *Focal Point,* the Ultimate Organizer. Or order direct: call 800-345-2888, Operator 300. $99.95 suggested retail price. ***Free Demo Disk.*** (Well, almost free—there is a $5.00 postage and handling fee.) Call the 800 # above to order. Self-running demo requires 512K but does not require HyperCard.

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HYPERWARE™ FROM ACTIVISION.

Select from 18 ready-to-use *Focal Point* functions (or create your own with HyperCard) and take advantage of all the links shown here.

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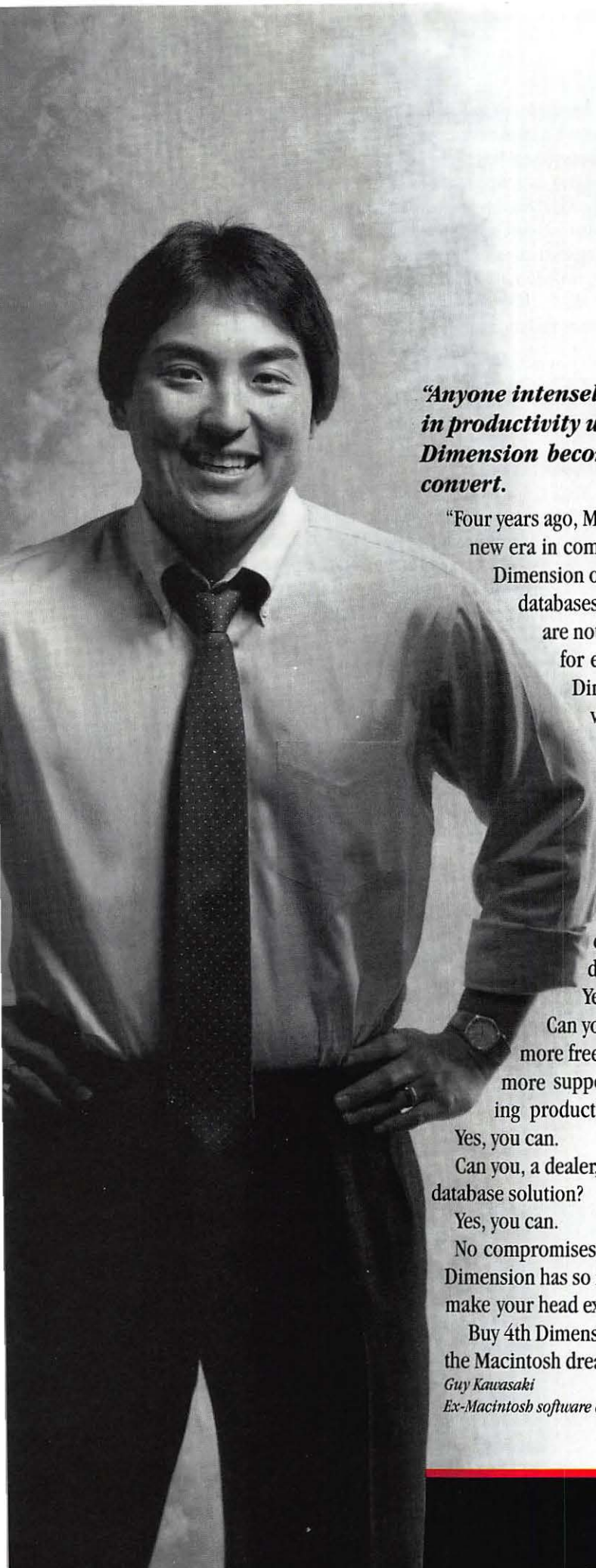


# YES,

***"Anyone intensely interested in productivity who sees 4th Dimension becomes a Mac convert.***

"Four years ago, Macintosh™ opened a new era in computing. Now, 4th Dimension opens a new era in databases. For the first time, you are not forced to trade power for ease of use. 4th Dimension endows individuals with an elegant tool to analyze and control information—simple or complex, single user or multiuser.

Can you, a first time user, get great results quickly with a relational database?

Yes, you can.

Can you, a developer, get more freedom, more features, more support to create outstanding products?

Yes, you can.

Can you, a dealer, confidently deliver a database solution?

Yes, you can.

No compromises. No sacrifices. 4th Dimension has so much power it will make your head explode.

Buy 4th Dimension and own a piece of the Macintosh dream."

*Guy Kawasaki*
*Ex-Macintosh software evangelist* ■

***"I have absolutely no training in databases, but I'm now using 4th Dimension day in and day out.***

"Anything I want, I can build by myself.

The graphics are super. 4th Dimension is so easy to set up, easy to modify, flexible and powerful. And I'm getting technical support from ACIUS anytime I need it.

4th Dimension doesn't eat data. If I make a mistake, data is preserved. I've never needed a backup copy of anything, and I've put it through some pretty severe torturing."

*Walter W. Stewart*
*4th Dimension end user*
*Research Physicist, National Institutes of Health** ■

***"4th Dimension is the most powerful database I've ever recommended for a micro.***

"And it's in the same class as the most powerful databases for minis and mainframes.

We've sold a lot of them. I feel good about recommending it, whether to low end users or high.

It's easy to use and easy to program. You have all the features of the Mac interface that make it easy. Windows. Menus. Buttons. Scrollable areas. Graphics.

It simply gives you all the tools you need to fully exploit the Mac and bring new power to your specific applications.

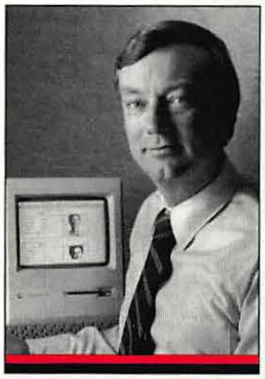
# YOU CAN.

In fact, I've become a developer myself. I wanted a point of sale application to run my business. I developed the system originally on a competitive product, but it didn't have the horsepower to solve the problems. 4th Dimension has the power to do anything I want to do.

I can offer no more sincere testimonial for the products I sell than to use them to manage my own business."

*Dick Applebaum*
*Apple dealer and business co-owner*
*Computer Plus, Inc.* ■

### *"When you sit down at a computer, there are two ways to go, IBM® or user friendly.*



"In other words, what you see is what you're used to working with.

These are the reasons I like 4th Dimension: It's got the power to do everything I need in a complex vertical market. It's got the interface to make that possible without taking on a second career. It's got layout graphics that can make your product look as good as it works.

You can sit down and use 4th Dimension without doing much to it, and you still have complete power. It has some dynamic, *dynamic* graphics. All this without programming. The others bog you down in housekeeping chores.

The custom mode enables me to use words, sentences, phrases, and icons that are familiar to my people in the real estate business. I have the ability to customize menus and menu items.

I enjoy working with 4th Dimension because of its power, interface, and the ability to create custom programs for my clients. I can't think of anything better than 4th Dimension as a development tool, and I've looked at them all."

*Ted Bobrer*
*Developer*
*Concept 2001* ■

### *"The thing I like best about 4th Dimension is that it works the way I expect it to work.*

"The whole screen interface is so much nicer than the others.

With dBASE,™ I spend a lot of time looking at the books and then creating screens. I never get it near right the first ten times.

I really like the way the subfiles work. I use that a lot because I maintain inventory sheets and I need to pull information from other places.

I like how it does everything automatically, like buttons, radio buttons, check boxes, and scrollable windows. You really don't need training to use these features."

*Diana Foster*
*4th Dimension user*
*PC Coordinator* ■

**The opinion expressed is not an endorsement by the National Institutes of Health nor the Federal Government.*

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***Want to try it out? Yes, you can!***

For $20, we'll send you a demo disk and comprehensive 50-page user's manual. Call today, and find out what 4th Dimension can do for ***you!***

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## Letters

*for the SE (and the Mac II) called the Mac-101 ADB Board for $169.95. You may find this one more to your liking. At any rate, you probably won't be seeing any keyboards designed for lefties in the foreseeable future.–Ed.*

### Ciao, Macintosh

Steven Levy's amusing column "Which Is the Most Famous Mac of All?" (October 1987) reminded me of the first Mac I ever encountered, in Florence, Italy. Instead of the familiar "hello" across the screen, it said "ciao," and then displayed a fine animated graphic. Equally memorable were the Italian advertisements for the Mac. I recall one showing the mouse being operated by a hand clad in a leather racing glove, sporting the slogan, "Prova su strada Macintosh." Loose translation: "Macintosh is proven on the road."

*Jeff Twardoski*
*Hazelwood, Missouri*

### Have Faith

There seems to be no end to the horror stories I've heard about Apple dealers, but I'm happy to report I've always gotten swift repairs and courteous service from Williams Computer Center (WCC) in Spring, Texas.

WCC maintains a user bulletin board, sends out a customer newsletter, and offers user groups and educators a 10 percent discount. Dealers like this really do exist.

*Mark Bigham*
*Houston, Texas*

### Macworld Stacks

While searching through some back issues, I thought about how great it would be if *Macworld* were to create a stackware program to make it easier to find articles. You could send it to subscribers or at least make it available to user groups. How about it?

*Ron Roman*
*Los Gatos, California*

*We're putting together a* HyperCard *stack for our 1987 annual index, which should be online on CompuServe by the time you read this.–Ed.*

### Turbocharging the Editors

Judging from their photos, *Macworld*'s editors and contributing editors are a lethargic lot who could use some energizing.

*(continues)*

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# It's As Plain As

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**After 2½ years and over 20,000 drives shipped, Warp Nine continues to manufacture the highest quality drives for Macintosh Computers.**

***The Photon 20, 30, 40 and NEW 80***
Our best selling products are 21, 31, 41 and 80Mb external SCSI hard drives. MacUser says *"The Warp (Photon) 20 delivers excellent value" and "The support from the manufacturer was very good." Feb. '87.*

- All drives are fan cooled moving air through the drive front to back, not out the bottom where it will reheat your drive, unlike our competition.
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***Software Products.***
LaserSprint—Laser spooler—**$59.95**
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***Introducing Three New Internal Hard drives for the Mac SE.***
Buy a Mac SE with two 800k floppies. Then install our internal hard drive in place of one of the 800k floppies. Takes 15 minutes. Gives you a hard and floppy drive for hundreds less than Apple. Features that Apple doesn't offer:

- 4 shock mounts to absorb the bumps of everyday use.
- Pushbutton SCSI addressing
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P20i (20 Mb)—**$449.00***
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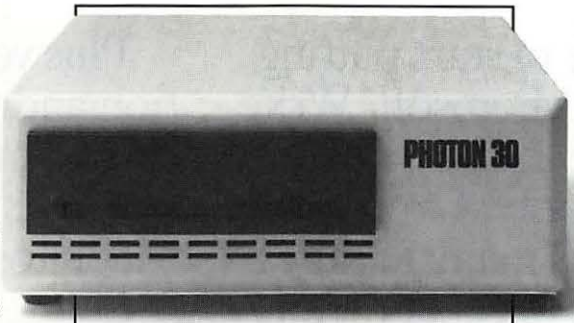
P45i (45 Mb)—**$749.00***

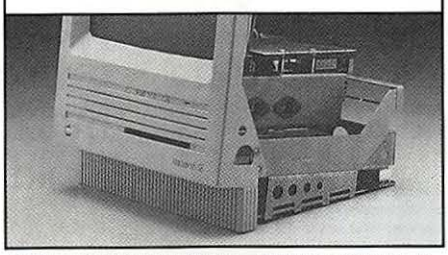
*This price includes a rebate of $100.00 if you return the 800k floppy drive to us in our pre-supplied box. P20i, P30i and P45i without rebate $549.00, $699.00, $849.00 respectively.




THE PHOTON 20, 30, 40 AND 80
Hard Drives

THE PHASER 800
Floppy Drive

MAC II 50 AND 80Mb INTERNALS
(The same drive Apple uses)



MAC SE INTERNAL HARD DRIVES

***For 512k Owners.***
All our hard drives and tape drives work with your 512k enhanced. Just add our easy to install **Plusport** SCSI port adapter. **$139.00**

***Photon 2001***
The 2001 is a combination 20Mb hard drive/20Mb tape drive. *MACazine said our tape backup "software is topnotch and simple to use, the benchmark times are very good and the drive is quiet.*

**$1399.00**

***Phaser 800***
*MacWorld* described it as "So quiet it would be unobtrusive anywhere except a library on Friday night." (Nov. 86) Works with 128, 512, MacPlus, and SE.

**$179.00**

***Mac II 50 and 80Mb internal hard drives***
We use the same Quantum drive that Apple installs. Comes with everything you need to mount into your Mac II in less than five minutes. Why pay more for the same product?

**$949.00 $1,295.00**

**1 year Warranty. All Warp Nine products come standard with a one year warranty.**

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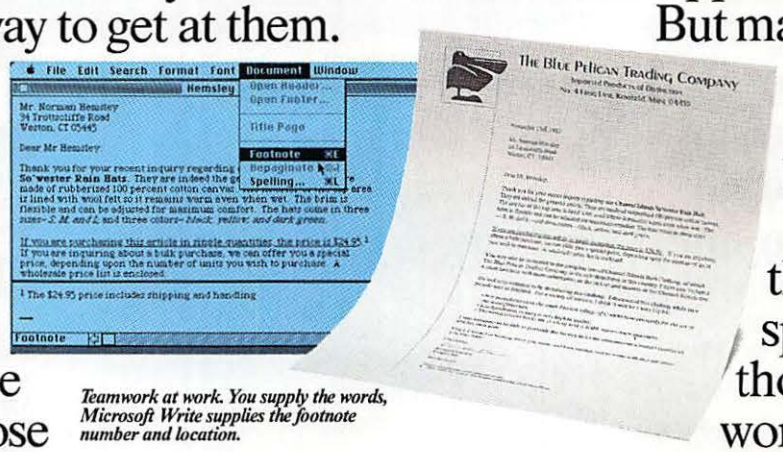
# Write from

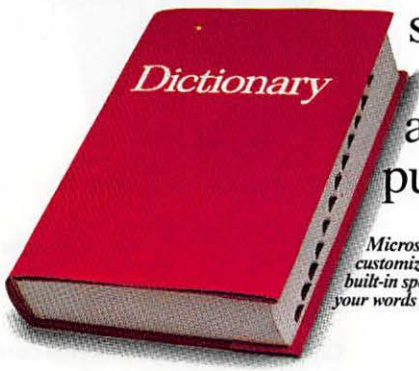
When it's time to start putting words on paper, Microsoft® Write is the right place to start. Because no comparably-priced word processor gives you as many features. Or an easier way to get at them.

If you already own a Macintosh,™ you already know how to use Microsoft Write. Because it shares all those great Macintosh qualities. Like comprehensive, pull-down menus. And familiar point-and-click operation.




*Teamwork at work. You supply the words, Microsoft Write supplies the footnote number and location.*

But don't worry if you've never made friends with a mouse before. Microsoft's exclusive on-line context-sensitive Help puts the answers to most of your questions a mere button push away.




*Microsoft Write's 80,000-word, customizable dictionary helps our built-in spelling corrector make all your words letter-perfect.*

Plus you get all the documentation and telephone support that's helped make Microsoft's family of products the most popular of all Macintosh applications.

But making it easy to get your words on paper is just the beginning.

For example, thanks to a built-in spelling corrector, those well-chosen words of yours will all be impeccably spelled. And, thanks to another innovative feature, properly placed as well.

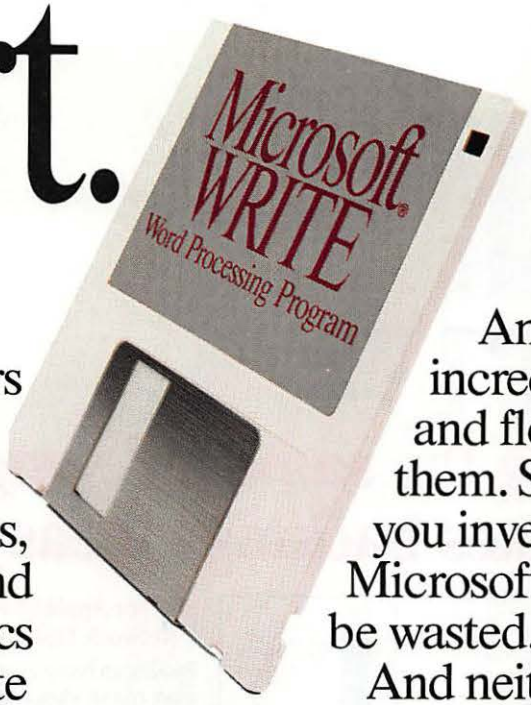
Because the page preview command offers you the unique opportunity to examine your work a miniature page at a time. So you can review, and revise, all those little factors that make the difference between a good looking document and a great one.

AAAA

*Team Microsoft Write with a LaserWriter™ printer and your words*

Microsoft is a registered trademark of Microsoft Corporation.

# the start.




Like where pages break and margins fall. And how the headers and footers lay out.

What's more, with advanced features like automatic footnotes, newsletter-column formatting, and the ability to mix text and graphics on the same line, Microsoft Write adds authority, and clarity, to all types of writing. With about as much effort as it takes to dot an i.

But Microsoft Write doesn't stop there.

As your word processing needs grow, you can always take advantage of the powerful, professional features of the Macintosh's leading word processor, Microsoft Word, Version 3.

AAAAAAAA
*can stand as tall, or as small, as you'd like.*

Without going back to page one.

In addition to using your existing files, Word uses the same commands as Microsoft Write.

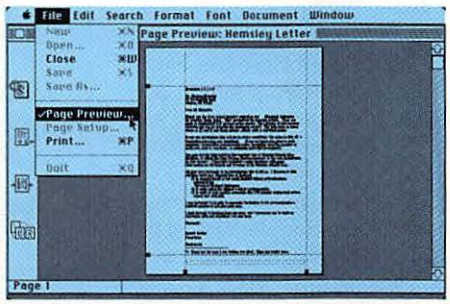
And then adds incredible features and flexibility to them. So the time you invest with Microsoft Write won't be wasted.

And neither will your money. All registered Microsoft Write owners can upgrade to Word at a special, reduced price.

Before it's time to face up to the infamous blank page, call (800) 541-1261, Dept. B63, for the name of a Microsoft Write dealer near you.

Trust him to give you everything you need to get your writing started.

Except, perhaps, an opening line.




*With Microsoft Write's page preview command, what you see on the screen is what you'll see on your paper. Line after line after line.*

*Got a question? Microsoft Write's on-line, context-sensitive Help gives you the answer. Right on the spot.*

Microsoft® Write

Macintosh and LaserWriter are trademarks of Apple Computer, Inc.

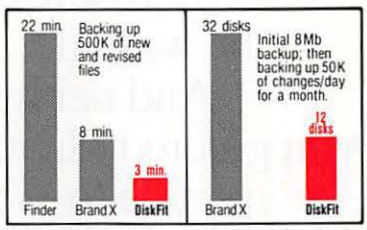
# Stop singing the same old song. DiskFit makes backing up easy.

With all that precious data on your hard disk, it certainly makes sense to back up regularly.

So why don't you?

Because your current backup "solution" is so much trouble, you probably can't stand putting yourself through the torture.

Now, there's an easy way to end your backup blues — DiskFit™.




*Without DiskFit, backing up a day's work can be so tedious you might be inclined to skip it altogether – and leave your data unprotected.*




*Unlike other back-up programs, DiskFit's backup disks remain a manageable size – even after months of incremental backups.*

**DiskFit is automatic.** DiskFit manages the entire backup process so you don't have to. It scans your hard disk ior files that need to be backed up. Then it deletes obsolete files from the backup disks and fits your new files – in standard Macintosh format – into the reclaimed space. Automatically. And DiskFit only asks for the disks it needs. DiskFit even formats your blank floppies, verifies the integrity of the backup, and generates a backup report.

**DiskFit is fast.** A typical day's work is backed up to floppies in just about three minutes. Backing up from one hard disk to another is even faster.

**DiskFit requires fewer backup disks.** Other programs are inefficient; they don't reclaim the space left by old files, so they require an ever-increasing number of disks each time you back up.

Not so with DiskFit.

It's smart, so your backup set grows only as much as your files do. And since no directory disk is required, you have nothing to lose. Even if you lose one of your backup disks, DiskFit will recreate it.

**And for AppleShare™ – Network DiskFit.** Backing up becomes even more crucial when using shared volumes. If losing one person's data is bad, imagine losing an entire workgroup's. Network DiskFit is the only backup utility that restores AppleShare folder ownership and access privilege information automatically, so the network administrator doesn't have to.

Network DiskFit resides on the server volume; each user on the network can also back up their local hard disk as well as their files on the server.

**Money back guarantee.** We're so confident that DiskFit and Network DiskFit outperform your present backup system that if you are not completely satisfied, return your purchase to us within 30 days for a full refund.

Get DiskFit and stop singing the backup blues.

- **DiskFit: $74.95**
- **Network DiskFit: $395.00**

SUPERMAC SOFTWARE

295 N. Bernardo Avenue
Mountain View, CA 94043
(415) 964-9694

System requirements: Macintosh 512, Plus, SE, or Macintosh II with one or more HFS-format hard disks.

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## Letters

David Bunnell, Jerry Borrell, Steven Levy, and Jim Heid seem unable to hold their heads up without cradling their chins in their hands. Only Lon Poole looks able to hold his head high without any support. Maybe the rest of them should find out what vitamins Poole's taking.

*Jim Cretcher*
*Cupertino, California*

*After a few too many deadlines, perhaps* Macworld's *multitasking editors just aren't as durable as their computerized counterparts.—Ed.*

### Trump Card

After reading "The Two Faces of HyperCard," (October 1987), I bought a copy of *HyperCard* but was surprised to find that scripting and HyperTalk were not covered in the manual. Instead, I found a phone number to call about purchasing another manual, called *HyperCard Script Language Guide.* When I called, I was told I would have to pay $19.95 for the manual plus another $20 for joining APDA (Apple Programmer's and Developer's Association). The $49 price doesn't seem like much of a bargain when you discover the extra $40 in costs that aren't mentioned in the ads.

*Donald Hagner*
*Summit, New Jersey*

*According to Apple, more than half of* HyperCard's *help cards are devoted to the program's scripting language, HyperTalk, and can be printed out for easy reference.—Ed.*

### Irreconcilable Differences

I recently encountered a problem when trying to run a screen-saver DA, *AutoBlack,* on a Mac II (System 4.1, Finder 5.5) and a Jasmine 80 hard disk.

After starting up from the Jasmine, I got the welcome screen with the top half missing and a bad case of the shakes. Since I couldn't get the drive to appear on the desktop, I couldn't remove the screen blanker's *MacBugs* file from the System Folder. I finally had to start up from another drive to trash the file.

*AutoBlack* is a useful program that works well on a Plus, but apparently not on a II, at least not with a Jasmine 80. I now use *Blank* from Cortland Computer, which works fine on my Mac II.

*Paul F. Jacobson*
*Westport, Connecticut*

*(continues)*

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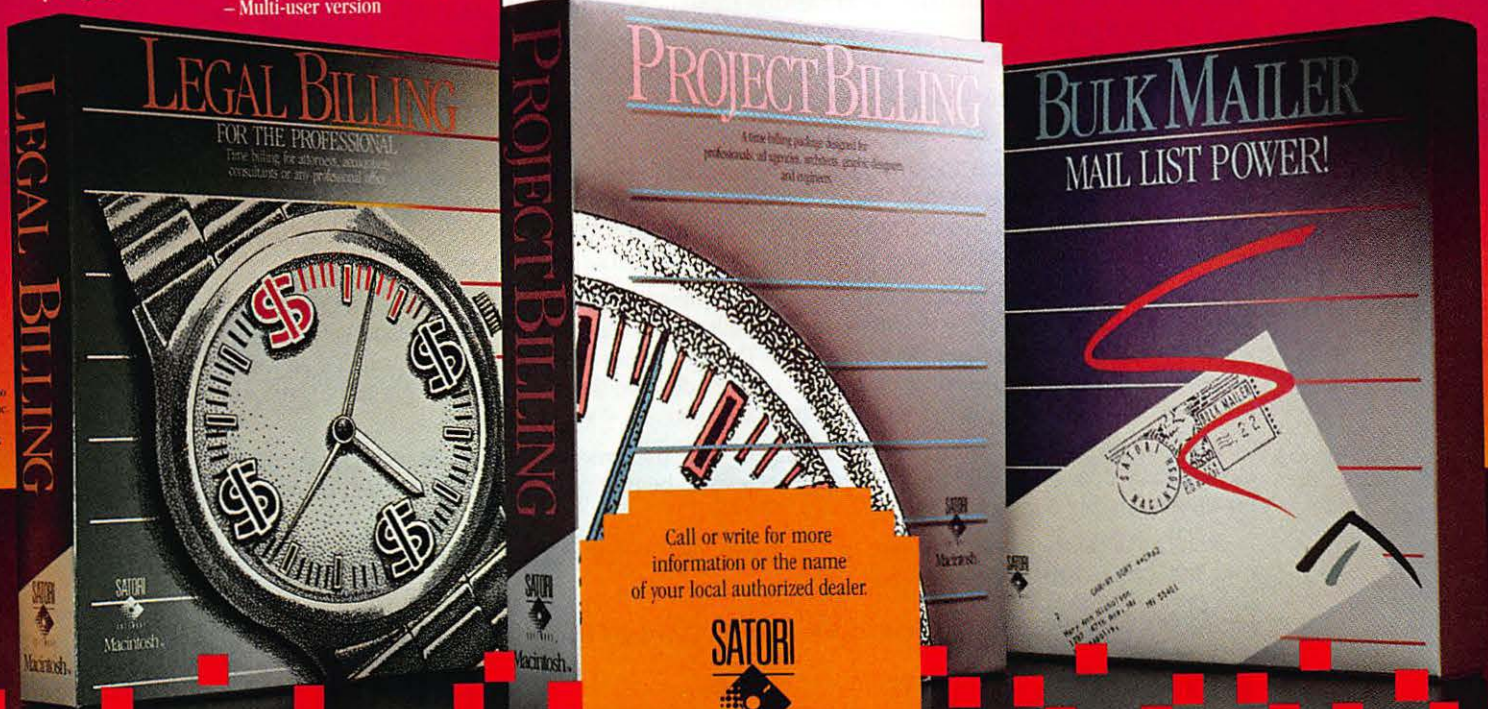


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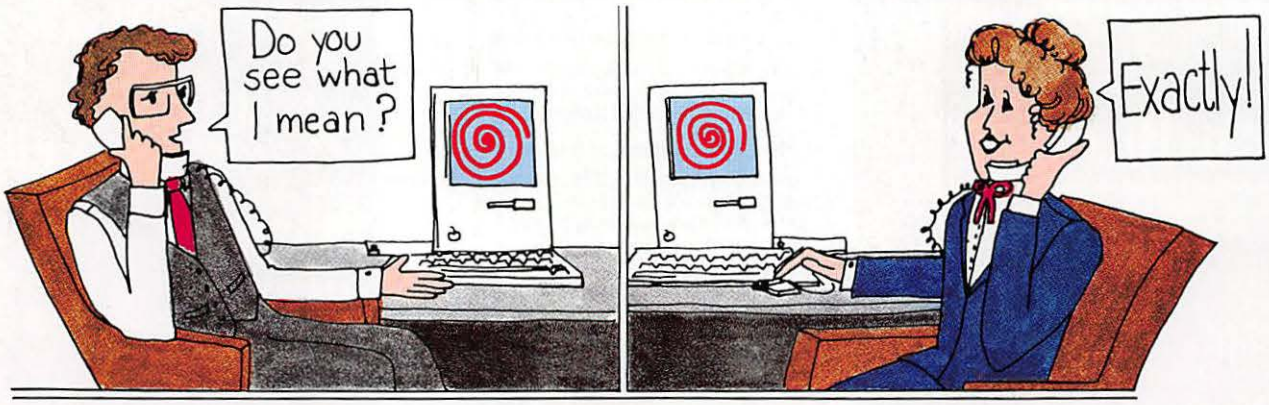


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### Mac II Bottleneck

I've read that the Mac II's performance would be greatly enhanced by a graphics coprocessor that could intercept most of the QuickDraw calls and by direct-memory-access circuitry for the disk drives. What hardware add-ons are now available–or being developed–that would overcome these deficiencies?

*Brooks Sherwood*
*La Jolla, California*

*Direct memory access from hard disk to main memory is theoretically possible through a card in one of the Mac II slots, but we know of no one who's currently developing one. RasterOps is working on a 24-bit-per-pixel graphics board that will reportedly include a coprocessor.–Ed.*

### What Makes a Hard Disk Run

If your SCSI hard disk won't work with your Mac II, you've probably got the wrong device driver installed on the disk. At any rate, it's got nothing to do with the interleave factor, since that affects only performance, not compatibility. Because a proper interleave factor allows the hard disk to gather data and transfer it to the computer with a minimum number of spins, matching the disk's interleave with the CPU's transfer rate will speed data transfer. Some hard disk systems allow you to change the interleave factor from a range of 1.1 to 7.1, so you can experiment to find the one that best fits your system.

Also, you're better off with SCSI devices that provide external switches rather than software for setting ID numbers. If daisy-chained SCSI devices are accidentally given the same ID, the bus locks up and nothing works–including the software used to change the ID.

*Charles F. McConathy*
*CMS Enhancements*
*Tustin, California*

### Where's the Thesaurus?

After seeing in "The Final Spelling Test" (October 1987) that a thesaurus was available for *Word* 3.0, I called Microsoft but was told that the company has no such product and no plans to market one. Is there a good thesaurus that works easily within *Word* 3.0?

*Reed Williams*
*Dallas, Texas*

*The product, in transition when that article was written, was then called* Merriam-Webster's Thesaurus for Word 3.0 *and sold by Target Software. It's now marketed by Deneba Software (800/622-6827) as* Spelling Coach Merriam-Webster Thesaurus *($59.95) for use with* Word *and most other word processors. Deneba also bundles it with* Spelling Coach Professional *($199.95).–Ed.* □

*Letters should be mailed to* Letters, Macworld, *501 Second St., San Francisco, CA 94107, or sent electronically to CompuServe (70370,702), The Source (BCW440), or MCI Mail (addressed to* Macworld*). Include a return address. We reserve the right to edit all letters. All published letters become the property of* Macworld.


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**Additional Features:** **Allegro CL** • File compiler • Window-based inspector • Integrated, programmable editor • Modest memory requirements: 1MB RAM, 1.6MB disk storage **Coral LISP** • File compiler • Dialog objects • Full lexical closures • Dynamic variables **Object Logo** • Turtle graphics with multiple, object-oriented turtles • Macintalk objects • Apple Logo compatibility • MIDI support available

Object Logo can be yours for $79.95. Coral LISP is available for an introductory price of $99.95. And Allegro CL sells for an unbelievably low $599.95!

To order, call or write: Coral Software, P.O. Box 307, Cambridge, MA, 02142; (800) 521-1027, in MA, (617) 547-2662.

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Like our other Totem drives, Totem II uses removable cartridges that offer super high capacity —a whopping 20 megabytes.

Which is roughly 25 times the storage you can expect from a standard floppy. And at least 5,000 more pages than you can store on comparable removable media.

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And, you'll be pleased to notice that Totem II is priced for budget-conscious Apple users. At such a low cost per megabyte, you won't have to feel guilty about storing all those space-grabbing projects.

You can organize all your desktop publishing, accounting, music, graphics, writing or business files with far greater ease and in much less time.

Because at 37 ms, our Totem cartridges let you access files much faster than any other high-capacity floppies.

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| *Cartridge capacity* | *20MB (10,000 pages)* |
| *Media type* | *Durable, long-lasting Bernoulli cartridges resist head crashes* |
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So if you're looking for extremely high reliability, you can rest assured your data is secure and won't get corrupted.

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If you're looking for portability, you can tote our little 8-lb. Totem II drive in your briefcase or MAC bag. And speaking of MAC, Totem II fits neatly right under your MAC, MAC Plus or SE. It's MAC II-compatible, as well.

*Each Totem cartridge holds 20MB of data.*

For more information or for a copy of our latest brochure, call us now at 800 BERING 1 or 408 379-6900. Bering Industries, 240 Hacienda Avenue, Campbell, CA 95008.

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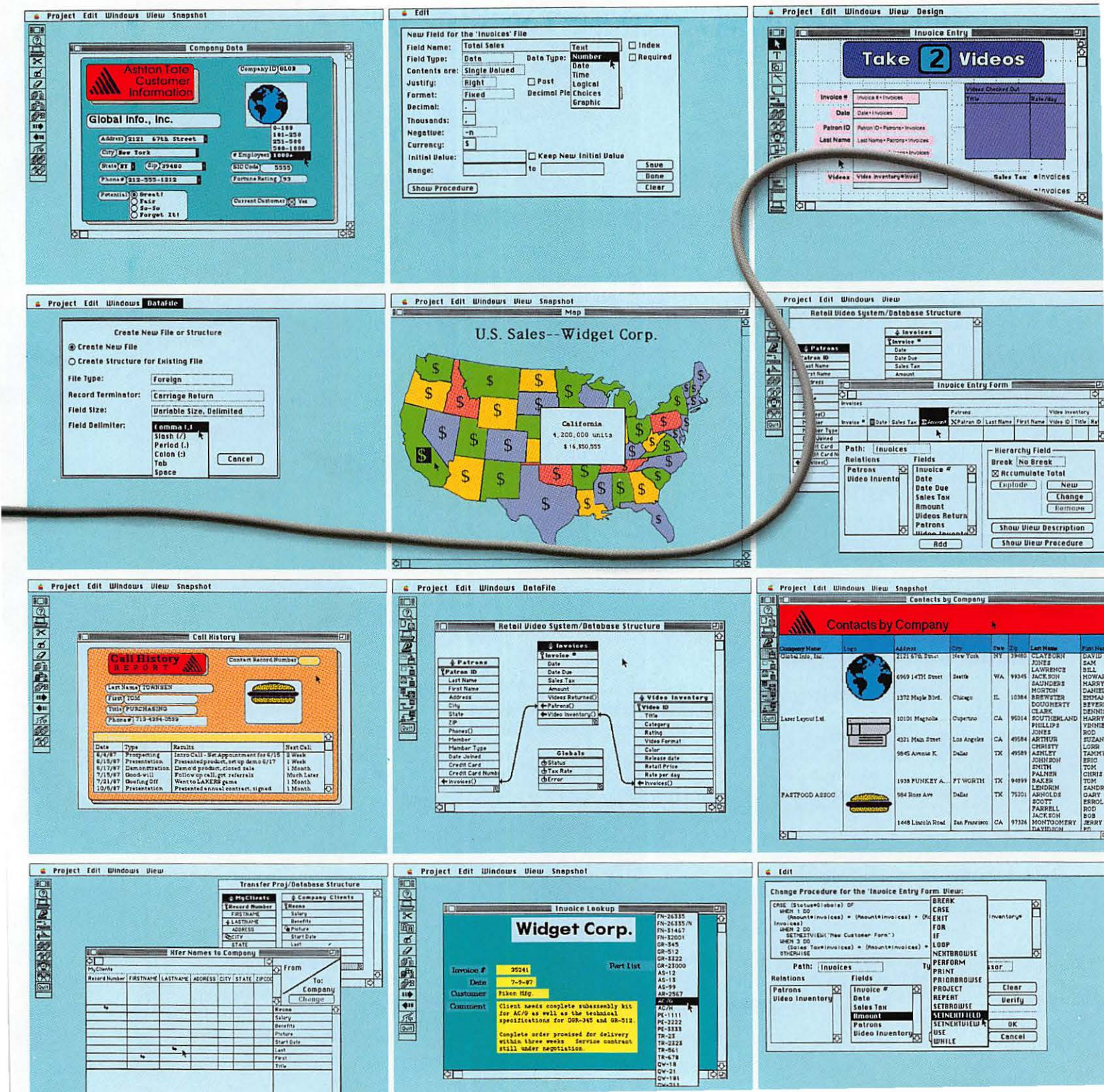
# powerful database ever

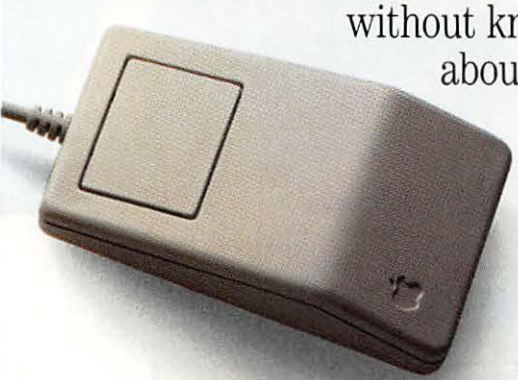


# ounces the most used by man or mouse.

It's called dBASE® Mac.

And it's the most powerful relational database designed for the Macintosh.™

Especially since, unlike other databases, you can get that power without knowing a thing about programming.



Begin by creating and relating your files.

Not just linking them, but relating them. So when you update one file, all your related files will be updated. Automatically. Immediately.

And remember, with dBASE Mac you can do all this without programming.

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And without any programming.

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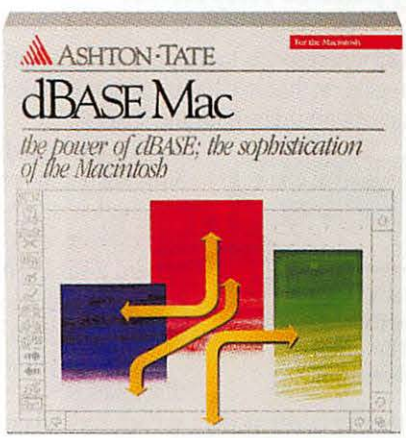
You can even import data from Ashton-Tate's dBASE III PLUS,™ dBASE III,® or dBASE II,® as well as ASCII files.

All without programming.

And all with the help of Macintosh's on-screen prompts and pull-down menus.

But if you want to go still deeper, the powerful dBASE Mac programming language will take you into a world of power and capability where no Macintosh has ever gone before.

If you would like a demo disk for $4.95,* or the name of the dealer nearest you, call (800) 437-4329, extension 2400.** You'll see how this Ashton-Tate relational database will make your Macintosh office work smarter.

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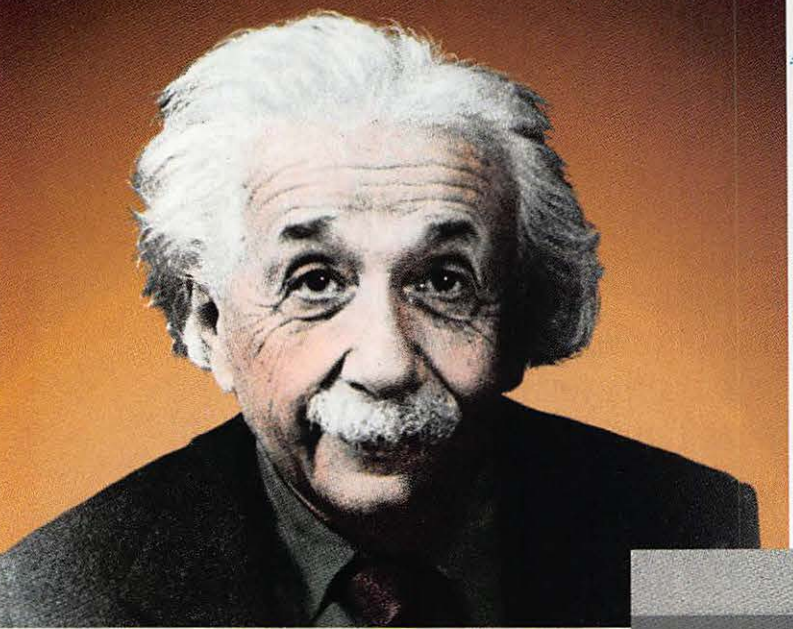
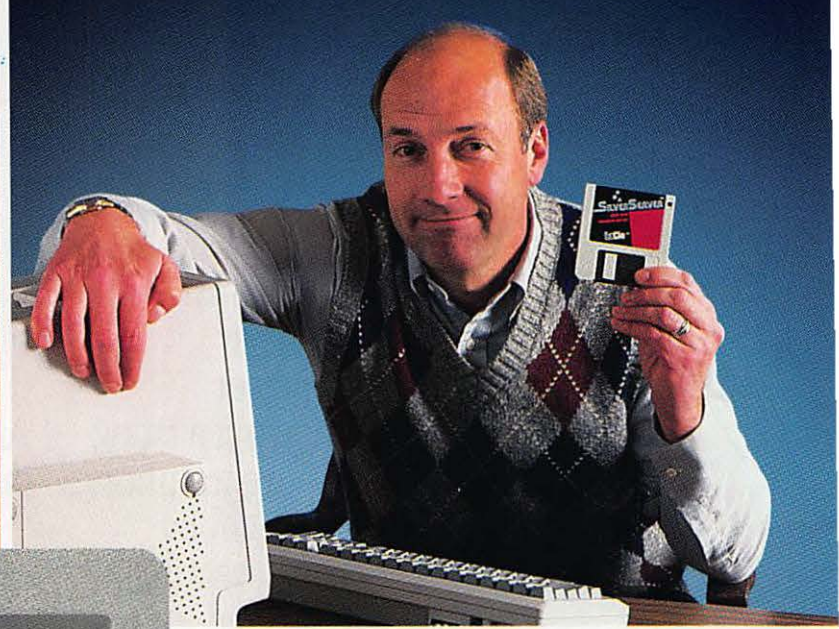
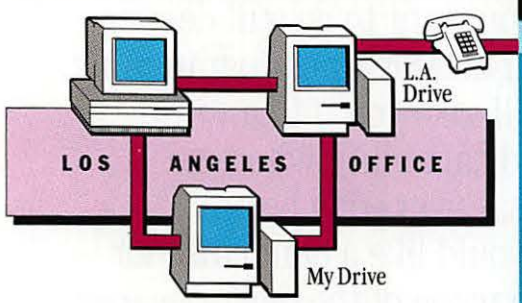
# For this man, time and space meant everything.

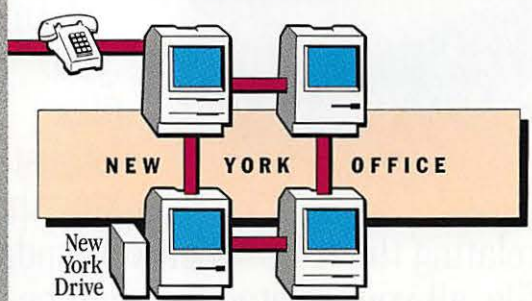


# For this man, time and space mean nothing.





Local or remote hard disks appear on the screen as icons to be opened whenever he wishes.




## SilverServer™ lets him share hard disks and modems. Anyplace. Anytime.

With all due respects to the person on the left, the person on the right has overcome a major obstacle imposed by time and space.

Through SilverServer hard disks are available to him as familiar icons that can be accessed just as if the drives were physically beside him. Best of all, SilverServer doesn't require anyone sitting at the other end. So, he can get a file from the office, home or New York whenever it's convenient, without worrying about time zones or other people's schedules.

He can access hard disks located at the office when at home.

He commands the power of SilverServer, the revolutionary disk and modem server from La Cie. With SilverServer he can bring the icons of hard disks in Los Angeles, San Francisco, Chicago, Dallas or New York up on his desktop from wherever he is.

At home. At work. All it takes is SilverServer and a modem at each end. When on AppleTalk, his modem needn't be connected directly to his Macintosh.

At the office, he can use SilverServer to share hard disks on his AppleTalk network.

Have you ever wanted to share hard disks or modems on your AppleTalk network? Now you can. Have you ever dreamed about accessing local or remote hard disks from your home or office? Well now you can.

SilverServer gives you new freedom in information exchange and resource sharing that the person on the left would have appreciated. **For more details contact La Cie at (503) 684-0143** and don't forget to ask about our mass storage products for the Macintosh.

**SilverServer from LaCie LTD.**

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**Circle 145 on reader service card**

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# The Theater of Technology

*A drama in three acts*

**Act I**

When we enter, the audience is already seated. Rows of seats, arranged in a semicircle, rise at a steep angle away from the stage. In the orchestra stands a chorus–as in ancient Greek plays–divided into two groups. One section is costumed in blue and white, the other in six-color stripes. The theater falls silent, and the house lights dim.

From the wings a blond man with a short beard walks to center stage. Polite applause. It is John Warnock, a well-known player in the theater of technology. He moves with the economy of the wise and begins a soliloquy to the audience.

"My friends. I come today to announce that PostScript is officially extended to the Macintosh as a screen language. Moreover, I say that PostScript is the single universal language that will allow all displays, computers, and printers to operate in a device-independent environment. It will free you from worries about which devices work together. It will allow Macintoshes, Sun Microsystems computers, IBM PS/2s, and the new NeXT computers to share the same programs."

From beneath the stage the chorus has begun a slow chant, but it is virtually inaudible. As the speaker warms to his subject, his listeners glance at one another. Before his twenty years in the theater of technology, Warnock was apprenticed to academe. A series of algorithms bears his name. And though he is not the most powerful actor in the theater, he is one of the most respected.

"PostScript is much faster now. We have rewritten all of the code." (Audible sighs from the uppermost rows.) "It can run interactively on 68020-based machines. It provides a rich alternative to QuickDraw on the Macintosh." A few skeptics are heard muttering that this act reminds them of one played here several years ago in which Don Estridge predicted a similar future for

JEFFERY NEWBURY

the virtual device interface. The murmur of the chorus is getting louder.

"We intend to publish the specifications of display PostScript. Third parties will be able to develop applications with color, text, and interactive graphics that will run under the new PostScript. You will no longer have to worry about what printer or display your applications drive. Apple will not do this–QuickDraw will never be capable of such functionality. At least, not soon enough."

Now the chorus breaks into two loud antiphonal refrains. "Too expensive. Too expensive," calls the blue-and-white side. "Not proprietary. Not proprietary," responds the six-color side.

The speaker raises his voice above the chorus: "Know you that PostScript, and only PostScript, can deliver you from endless software and hardware investment. Continue as you are, and you will build a techno Tower of Babel."

*(continues)*

*as crisp as the Adobe Illustrator side. That wasn't done on purpose. Both sides were done by the same talented artist, Jeffery West of Jeffery West Design, who, until recently taking up Adobe Illustrator, made his living with pen-and-ink.*

**Circle 678 on reader service card**

*By hand: 26 hours, 37 minutes. And counting.*

*With Adobe Illustrator: 12 hours, 42 minutes. Finished.*

**Commentary/Jerry Borrell**

System software. For it is the combination of innovative hardware and visionary software that makes us a truly great computer company. You must be patient while our software catches up; it will be worth your while. And by keeping this software proprietary we can control the quality and uniformity of third-party applications. We can continue to advance science and bring technology to a higher level."

He turns, preparing to leave, gazing for effect directly at the audience. A few of the truly faithful, hoping for more, clamor for an extemporization. "Swiss army knife," comes a call from the back. "Honda," cries a couple from Des Moines. But to no avail. He turns and stalks away, leaving the onlookers emotionally spent. They are convinced that though this may not be the answer for unification, it clearly is the answer for the future of computing and the human race.

**Act III**

Lights come up to reveal a thin, sandy-haired figure with large spectacles, standing center stage. Hands in his pockets. The eyes are bright, even at a distance. Bill Gates. He is an anomaly: one of the richest men in the world, and yet still a player–a participant–in this theater. He has the respect and reputation of one who has written entire plays himself. He can tread a tightrope between developers and manufacturers.

He begins to speak in the quiet voice of authority that comes only from experience. "PostScript is great. QuickDraw is great. Both have work to do. Neither will do all things. We have already defined the graphics architecture for the PS/2, the Presentation Manager. It isn't as rich as PostScript, but it has fonts, graphics, imaging, and color models. It will handle all of our needs."

From the chorus: "Just like VDI, CGIS, GDDM, and all the rest."

"The user will benefit from having separate standards," intones Gates. "They allow different manufacturers to add value to our applications in their own unique way. Developers will benefit because their common base of C code can be modified to run under the independent operating systems. Thus we will be able to concentrate on the functions of the packages rather than the interface." A snarl of derisive laughter with a French accent comes from offstage. Gates casts a withering look in that direction.

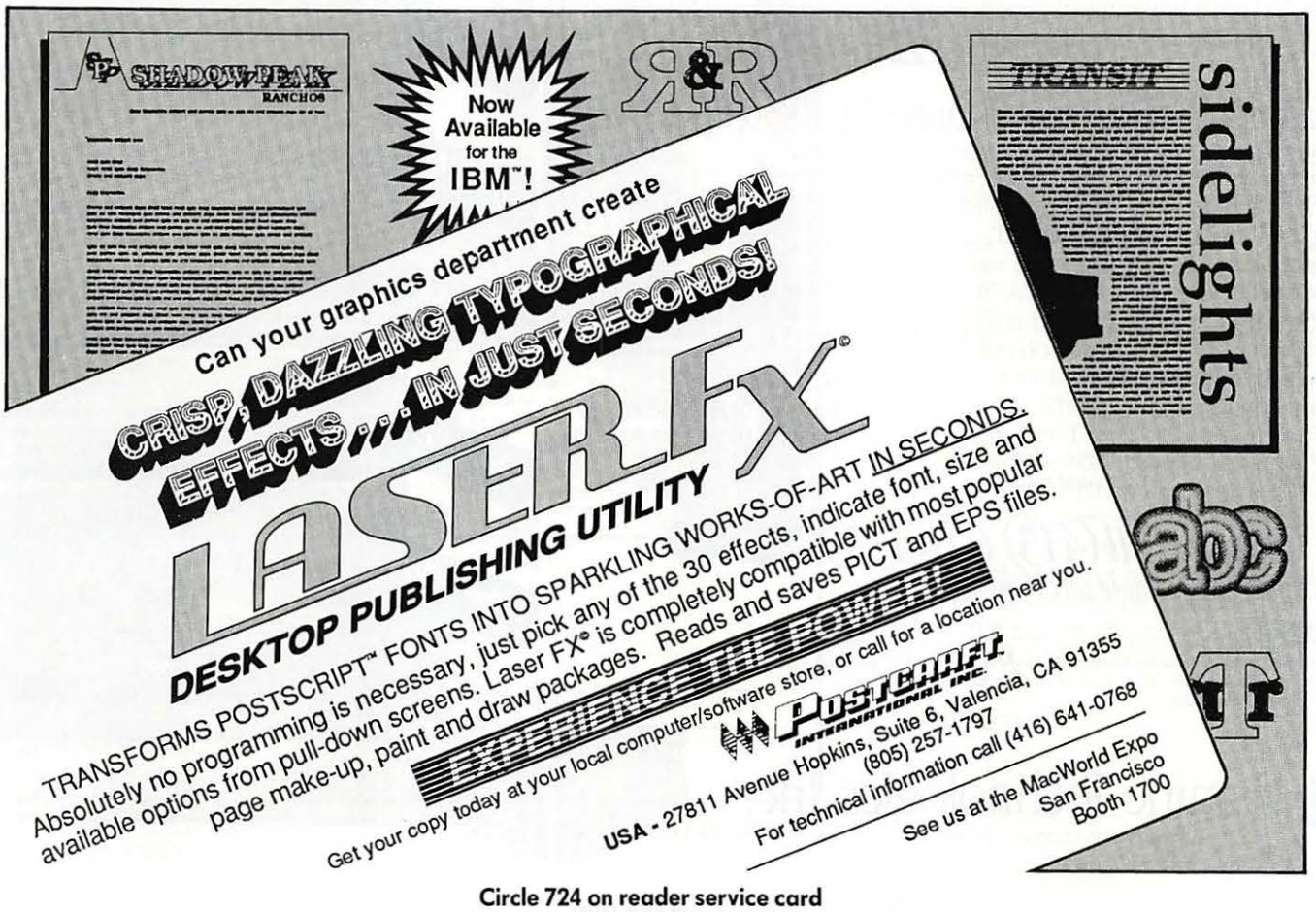
He continues: "It is unrealistic to assume that developers can afford to do otherwise. If development costs are lowered, we can advance the overall state of the art rather than spend our time worrying about the interface."

The chorus rejoins: "Yes, but who writes the interface?" and so on.

**Epilogue**

As Gates departs the stage, a raven alights upon a skull resting on a small table. Seven black swans on wires swing in low over the stage. A star rises in the East. Just as the audience's impatience with indecipherable auguries reaches a peak, an enigmatic figure in a tattered robe slowly shuffles to center stage.

The shadowy figure speaks: "What's it all mean? All the world's a stage, and all the men and women merely players. We hope that the price of admission is repaid by the entertainment." □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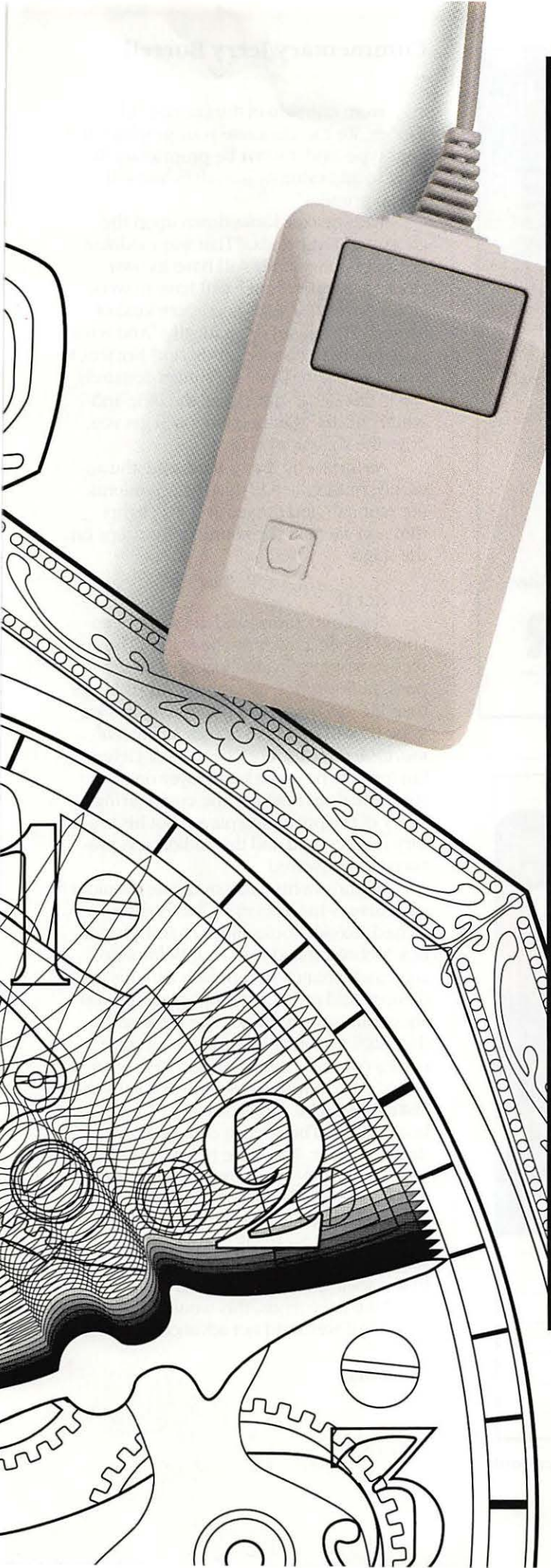

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On both sides, the artist started with a rough sketch which he traced over. (Adobe Illustrator allows you to trace over other kinds of existing art, as well.)

After that, all similarities end.

The Adobe Illustrator side is not only finished, it's cleaner, sharper, and includes details—like the strobe effect on the minute hand and maddeningly precise little circles on the rim— that simply can't be duplicated by hand.

To get these effects with Adobe Illustrator, you simply draw, step, and repeat the desired shape in whatever position or angle or size you like.

For example, the artist drew a single gear, then resized it and put it in different places. And Adobe Illustrator held the desired line weight regardless of image size.

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*You'll notice the side done by hand is unfinished and not nearly as crisp as the Adobe Illustrator side. That wasn't done on purpose. Both sides were done by the same talented artist, Jeffery West of Jeffery West Design, who, until recently taking up Adobe Illustrator, made his living with pen-and-ink.*

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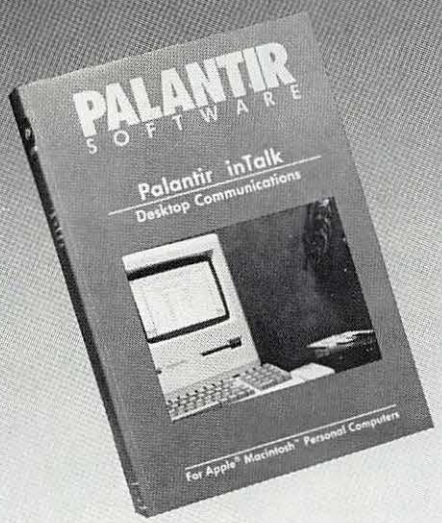
# Desktop Communications for Macintosh

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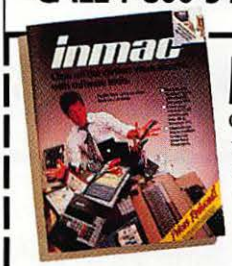


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## Commentary/Jerry Borrell

From one side of the chorus: "Clones. Clones. We can duplicate your graphics and your type, and it won't be proprietary. We want to add value by ourselves and sell cheap printers."

The speaker looks down upon the chorus and responds, "That way madness lies. Every developer will have its own clone; every developer will have to write clone drivers for each and every kind of printer." He pauses dramatically. "And what if IBM were to choose PostScript? Not that I would speak for IBM." He smiles demurely.

"Yes. Better not," cries the blue-and-white chorus. "Outline fonts will get you," cries the six-color group.

As the scene draws to an end, the audience must concede that the arguments are rational–and persuasive. The lights dim and we hear the sound of footsteps on the stage.

### Act II

Trumpets sound and out walks Jean-Louis Gassée, clutching the fasces. The audience wriggles in anticipation. Gassée–poet, philosopher, metaphysician–is larger than life. No doubt when the socialists are gone he will return to France as the *télématique* minister or to head Ciba-Geigy, but for now he is the best player on this stage. He does not have the engineering savvy of the preceding player, but his oratory is renowned and the audience is prepared to be swayed.

He throws his cloak over one shoulder and surveys his listeners. One eyebrow arched, Gassée looks like a cross between Jack Nicholson and Jean-Paul Belmondo, and easily creates an intimacy with his audience. "Did my worthy supporter tell you about our new machine? No? He forgot that, eh?" A look of sublime insouciance comes over his countenance. "Well, what would you do with a machine that runs as fast as a Porsche and looks like a Lamborghini?..." The speech continues, but it doesn't matter. The voice has won the audience over. They have already forgotten the earlier speaker. Hints about the technical prowess of the new machine follow. In fact, a few people toss blank checks on the stage in the hope of reserving one of the first machines to be produced.

"But my friends, this would not be possible if we could not advance our own

*(continues)*

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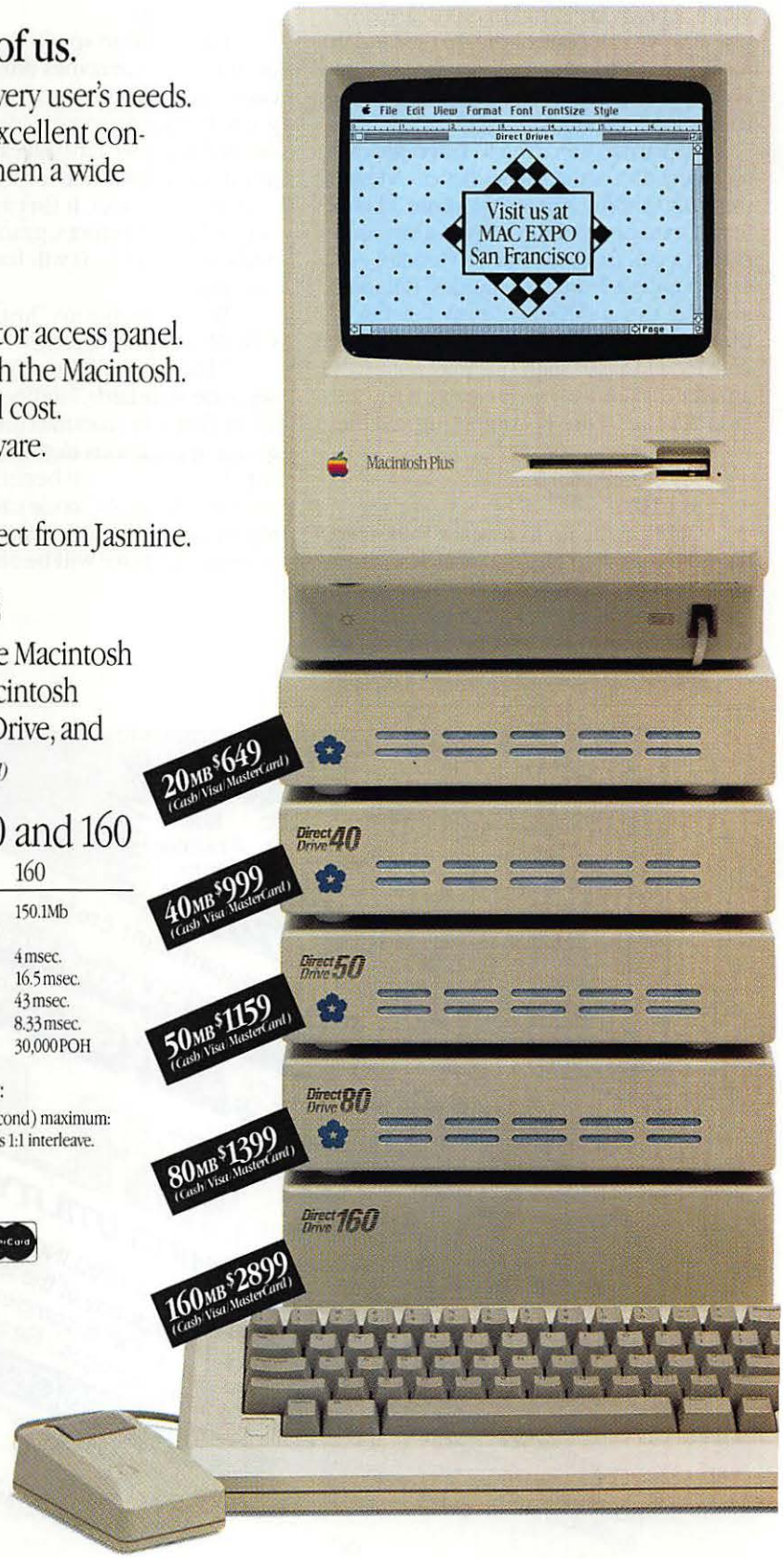
| Drive: | 20 | 40 | 50/80 | 160 |
|---|---|---|---|---|
| Capacity, after formatting: | 21Mb | 40Mb | 51Mb/77Mb | 150.1Mb |
| Access Time: | | | | |
| Track to Track | 20 msec. | 8 msec. | 5 msec. | 4 msec. |
| Average | 65 msec. | 40 msec. | 26 msec. | 16.5 msec. |
| Maximum Seek | 150 msec. | 95 msec. | 38 msec. | 43 msec. |
| Average Latency | 8.33 msec. | 8.33 msec. | 8.2 msec. | 8.33 msec. |
| Mean Time Between Failure: | 20,000 POH | 20,000 POH | 25,000 POH | 30,000 POH |

AC Outlets:

3-way with ground Fully fused
Rated Capacity: 7 Amps
Switched: At power on
Surge Protection: Protects drive and outlets

SCSI controller:

Transfer rate (per second) maximum: 1.25 Mbytes, supports 1:1 interleave.

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System software. For it is the combination of innovative hardware and visionary software that makes us a truly great computer company. You must be patient while our software catches up; it will be worth your while. And by keeping this software proprietary we can control the quality and uniformity of third-party applications. We can continue to advance science and bring technology to a higher level."

He turns, preparing to leave, gazing for effect directly at the audience. A few of the truly faithful, hoping for more, clamor for an extemporization. "Swiss army knife," comes a call from the back. "Honda," cries a couple from Des Moines. But to no avail. He turns and stalks away, leaving the onlookers emotionally spent. They are convinced that though this may not be the answer for unification, it clearly is the answer for the future of computing and the human race.

**Act III**

Lights come up to reveal a thin, sandy-haired figure with large spectacles, standing center stage. Hands in his pockets. The eyes are bright, even at a distance. Bill Gates. He is an anomaly: one of the richest men in the world, and yet still a player–a participant–in this theater. He has the respect and reputation of one who has written entire plays himself. He can tread a tightrope between developers and manufacturers.

He begins to speak in the quiet voice of authority that comes only from experience. "PostScript is great. QuickDraw is great. Both have work to do. Neither will do all things. We have already defined the graphics architecture for the PS/2, the Presentation Manager. It isn't as rich as PostScript, but it has fonts, graphics, imaging, and color models. It will handle all of our needs."

From the chorus: "Just like VDI, CGIS, GDDM, and all the rest."

"The user will benefit from having separate standards," intones Gates. "They allow different manufacturers to add value to our applications in their own unique way. Developers will benefit because their common base of C code can be modified to run under the independent operating systems. Thus we will be able to concentrate on the functions of the packages rather than the interface." A snarl of derisive laughter with a French accent comes from offstage. Gates casts a withering look in that direction.

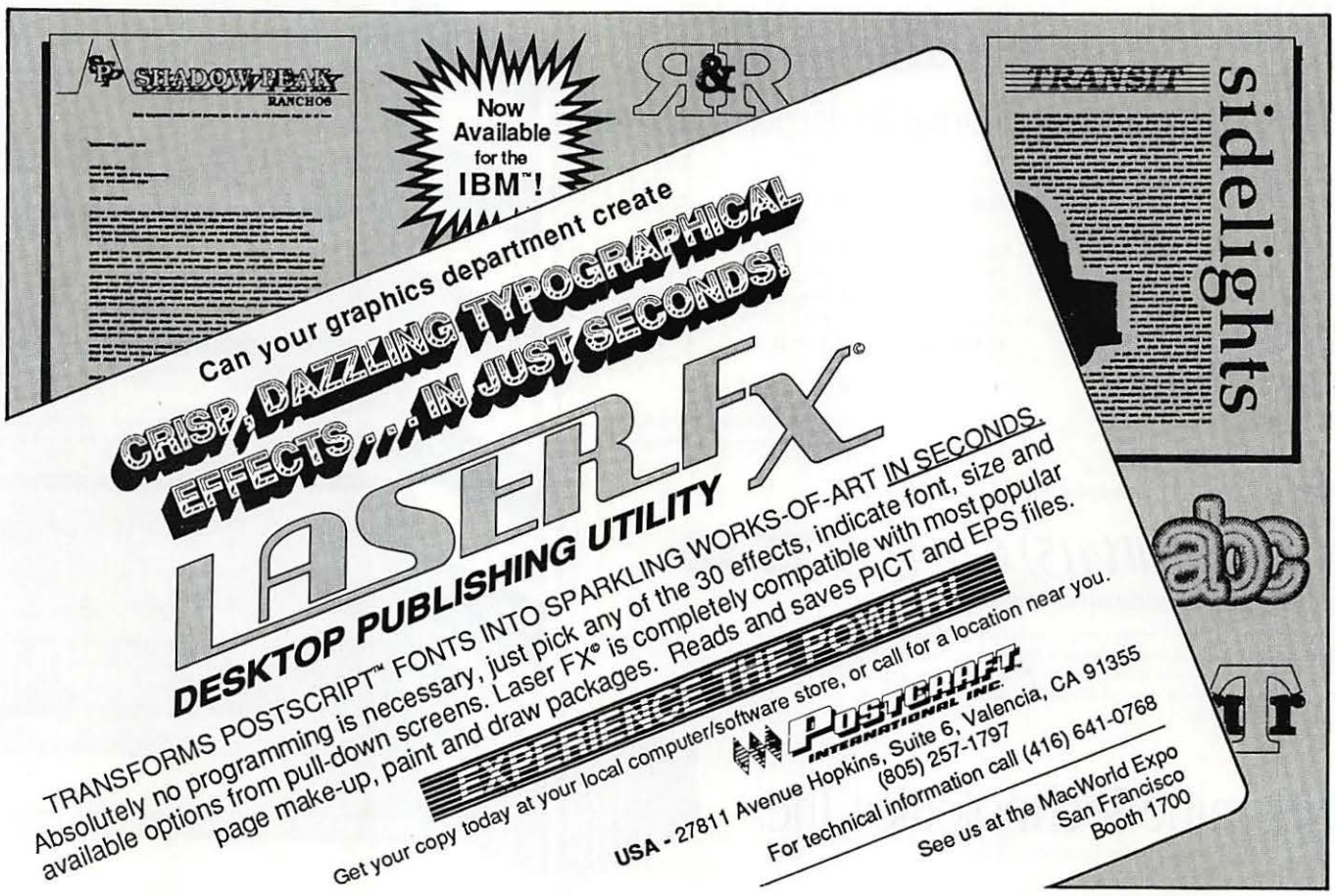
He continues: "It is unrealistic to assume that developers can afford to do otherwise. If development costs are lowered, we can advance the overall state of the art rather than spend our time worrying about the interface."

The chorus rejoins: "Yes, but who writes the interface?" and so on.

**Epilogue**

As Gates departs the stage, a raven alights upon a skull resting on a small table. Seven black swans on wires swing in low over the stage. A star rises in the East. Just as the audience's impatience with indecipherable auguries reaches a peak, an enigmatic figure in a tattered robe slowly shuffles to center stage.

The shadowy figure speaks: "What's it all mean? All the world's a stage, and all the men and women merely players. We hope that the price of admission is repaid by the entertainment." □



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## Technical Specs: InnerDrive 50, 90

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|---|---|---|
| Capacity, after formatting: | 51 Mb | 88.0 Mb |
| Access Time | | |
| Track to Track | 5 msec. | 4 msec. |
| Average | 26 msec. | 16.5 msec. |
| Max. Seek - Full Stroke | 38 msec. | 43 msec. |
| Average Latency | 8.2 msec. | 8.33 msec. |
| Mean Time Between Failure: | 25,000 POH | 30,000 POH |

SCSI controller:
Transfer rate maximum: 1.25 Mbytes/sec., Supports 1:1 interleave.

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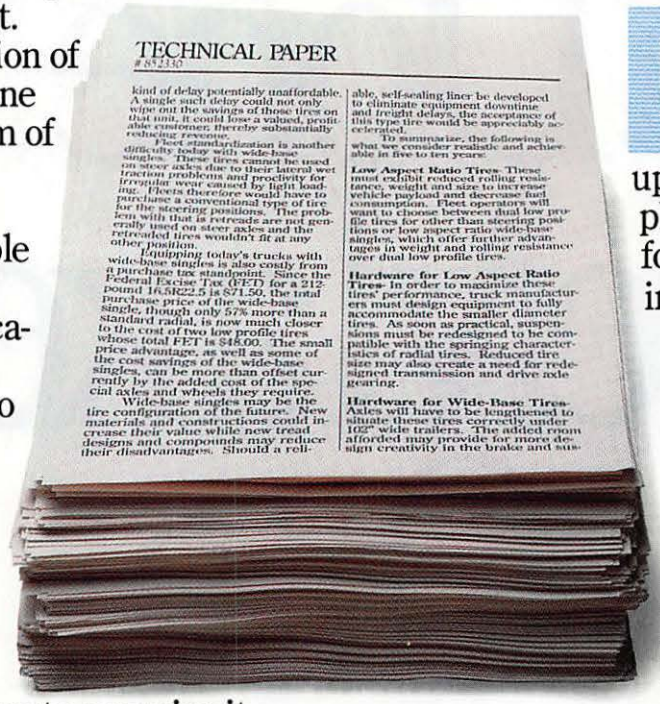
TECHNICAL PAPER
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kind of delay potentially unaffordable. A single such delay could not only wipe out the savings of those tires on that unit, it could lose a valued, profitable customer, thereby substantially reducing revenue.

Fleet standardization is another difficulty today with wide-base singles. These tires cannot be used on steer axles due to their lateral wet traction problems and proclivity for irregular wear caused by light loading. Fleets therefore would have to purchase a conventional type of tire for the steering positions. The problem with that is retreads are not generally used on steer axles and the retreaded tires wouldn't fit at any other position.

Equipping today's trucks with wide-base singles is also costly from a purchase tax standpoint. Since the Federal Excise Tax (FET) for a 212-pound 16.5R22.5 is $71.50, the total purchase price of the wide-base single, though only 57% more than a standard radial, is now much closer to the cost of two low profile tires whose total FET is $48.00. The small price advantage, as well as some of the cost savings of the wide-base singles, can be more than offset currently by the added cost of the special axles and wheels they require.

Wide-base singles may be the tire configuration of the future. New materials and constructions could increase their value while new tread designs and compounds may reduce their disadvantages. Should a reliable, self-sealing liner be developed to eliminate equipment downtime and freight delays, the acceptance of this type tire would be appreciably accelerated.

To summarize, the following is what we consider realistic and achievable in five to ten years:

**Low Aspect Ratio Tires**- These must exhibit reduced rolling resistance, weight and size to increase vehicle payload and decrease fuel consumption. Fleet operators will want to choose between dual low profile tires for other than steering positions or low aspect ratio wide-base singles, which offer further advantages in weight and rolling resistance over dual low profile tires.

**Hardware for Low Aspect Ratio Tires**- In order to maximize these tires' performance, truck manufacturers must design equipment to fully accommodate the smaller diameter tires. As soon as practical, suspensions must be redesigned to be compatible with the springing characteristics of radial tires. Reduced tire size may also create a need for redesigned transmission and drive axle gearing.

**Hardware for Wide-Base Tires**- Axles will have to be lengthened to situate these tires correctly under 102" wide trailers. The added room afforded may provide for more design creativity in the brake and sus-

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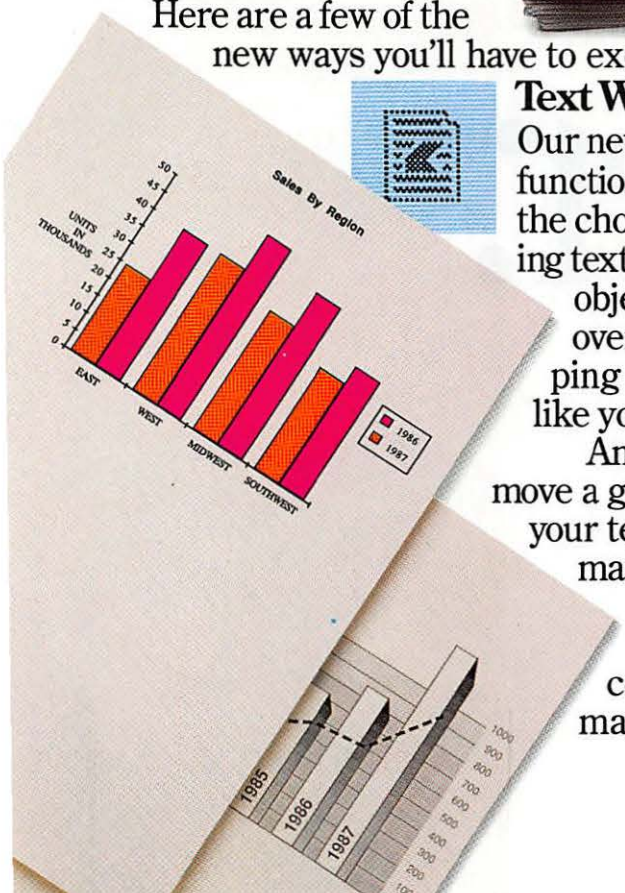


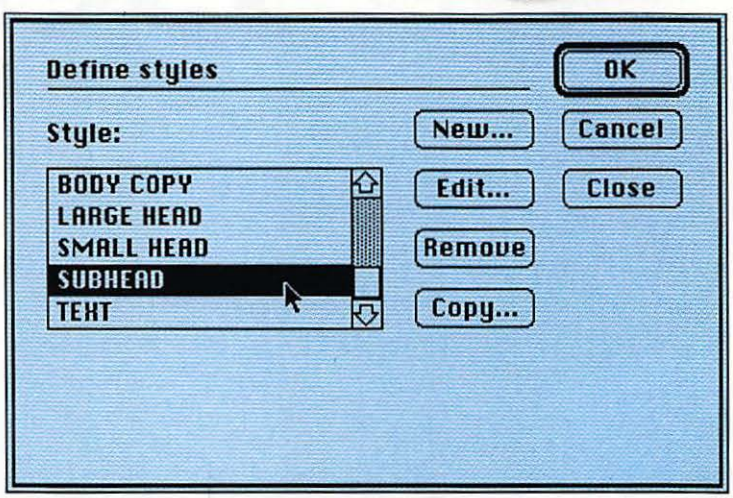

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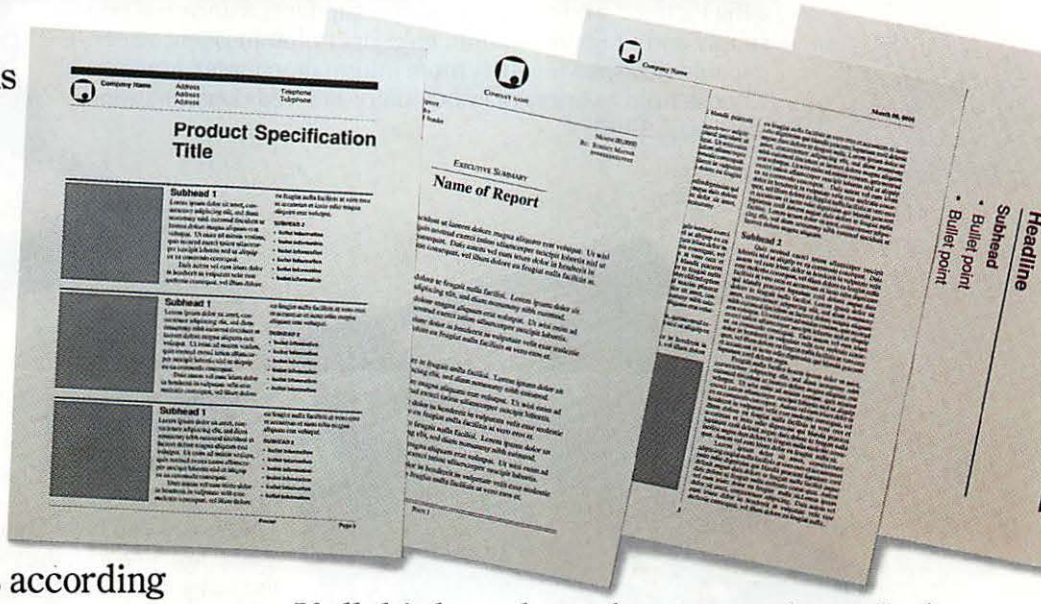

## Spot Color

Mix a virtually unlimited palette of colors based on any one of three standard color models: RGB, CMYK or HLS. Then you can tag any element in the publication with a color by just clicking your pointer on it.

And, when you print your document, PageMaker 3.0 gives you the choice of a single, composite image or separate sheets for each color used.

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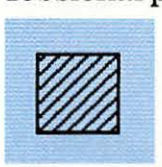

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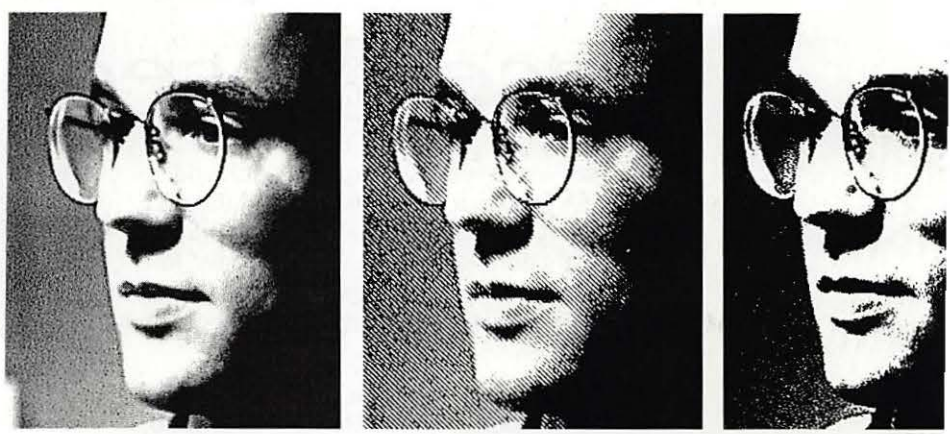

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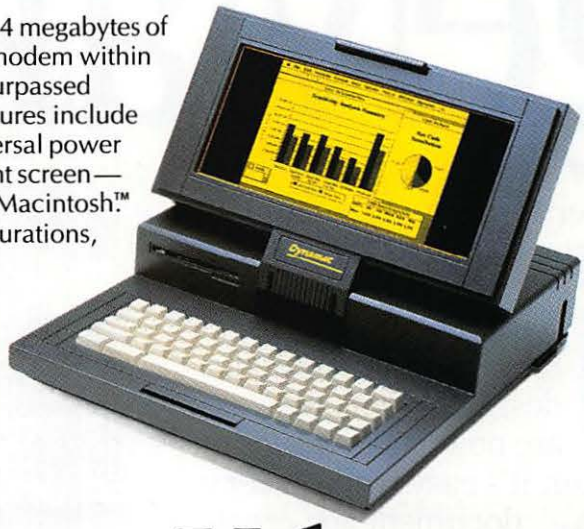

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# Contributors Notes

**Michael Bayles and Melanie Bayles** *("Just Write") published* The Macintosh Journal *for the last two years—he as editor-in-chief, she as managing editor. Michael is a Mac consultant who specializes in hardware and software evaluation. Melanie owns M&M Productions, a word processing and desktop publishing consulting firm in Orem, Utah.*

**Harold Borkin** *("Assessing the Mac II as a Workstation"), a professor of architecture at the University of Michigan, has used Apollo workstations since 1982. A developer of CAD architectural software and solid-modeling systems, he also teaches people how to use workstations for structural design.*

**Danny Goodman** *has been writing about computers since the seventies and has used the Mac since before its release. A* Macworld *contributing editor who writes the monthly* Business Clinic *column, he is the author of* Hands-on Excel *(Scott, Foresman & Co., 1986) and* The Complete HyperCard Handbook *(Bantam Books, 1987).*

**Jim Heid** *("Getting Started with Desktop Publishing"), a* Macworld *contributing editor and the author of* dBase Mac in Business *(Ashton-Tate Publishing, 1987), has been writing about the Macintosh since its introduction. Each month he turns his attention to a different topic in his column on Mac fundamentals.*

**Laurence Kirsch** *("Insights on FileMaker Plus") didn't waste a minute trading up from his Kaypro when the Macintosh first appeared. He has since cofounded Trace, Inc., in Arlington, Virginia, a firm that develops custom applications for the Mac.*

**Steven Levy** *("Tales of the MultiFinder") is a* Macworld *columnist and author of* Hackers: Heroes of the Computer Revolution, *now published in paperback by Dell.*

**Jim Morton** *("Mac Business Tools") is a San Francisco printer and desktop publisher who uses* PageMaker *to produce his* Pop Void *periodical about modern culture. An expert DTP forms designer, he sends in the cleanest invoices we've ever seen at* Macworld.

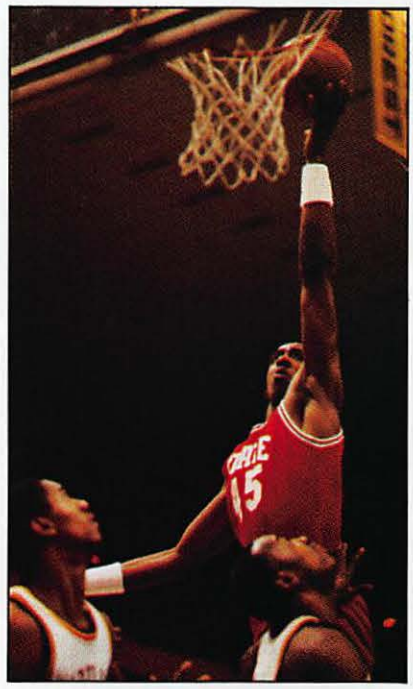
**Erfert Nielson** *("Live and in Color") was a founding member of the* Macworld *staff. She put her art-school training to work and quickly became a Mac graphics specialist. Currently doing free-lance writing in Hollywood, she is probably the only writer in town not working on a screenplay.*

**Lon Poole** *("Mac Communications Tools") has been educating Macintosh users since the machine was introduced. In his monthly* Quick Tips *column he answers readers' questions and offers advice. A collection of these tips can be found in his book,* Mac Insights *(Microsoft Press, 1987).*

**Charles Seiter** *("The Numbers Racket") is a chemistry professor turned computer writer whose books about computer topics include several published by Addison-Wesley on programming languages and financial modeling.*

**Andrew G. Shebanow** *("Assessing the Mac II as a Workstation") has been developing Macintosh programming tools since the Mac's introduction. He currently uses Sun workstations to develop image-reconstruction software for CAT Scanners.*

**Suzanne Stefanac** *("Data Savers") is a San Francisco-based free-lance writer who has been faithful to the Mac ever since her first encounter with a 128K. As a computer consultant for the San Francisco Unified School District and various private concerns, she has seen firsthand the disasters that can befall a poorly backed-up hard disk.* □

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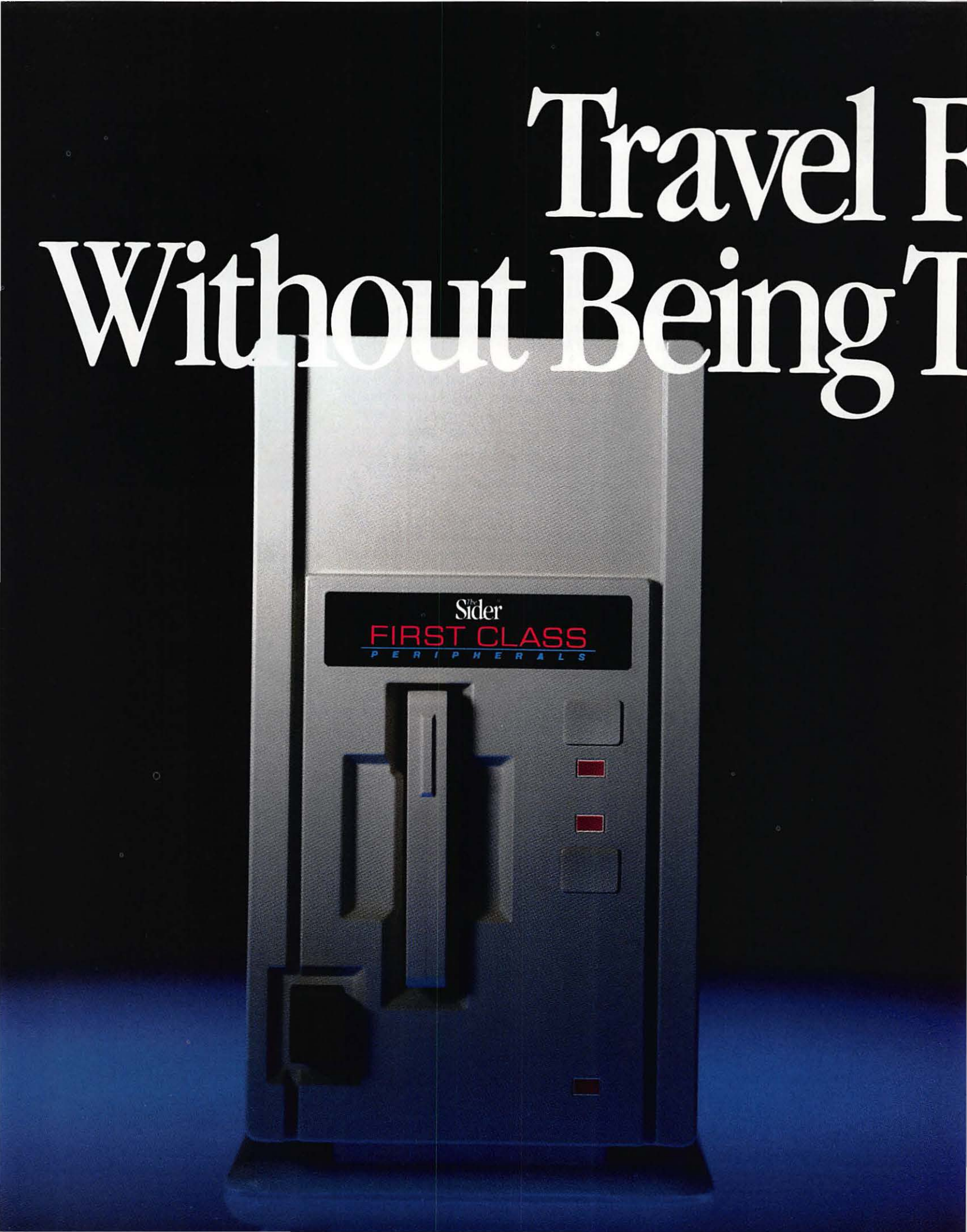

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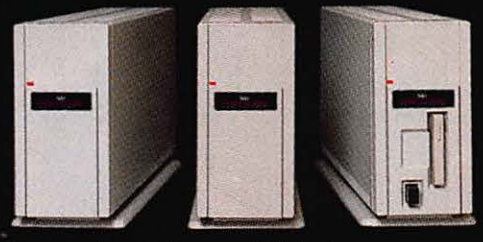

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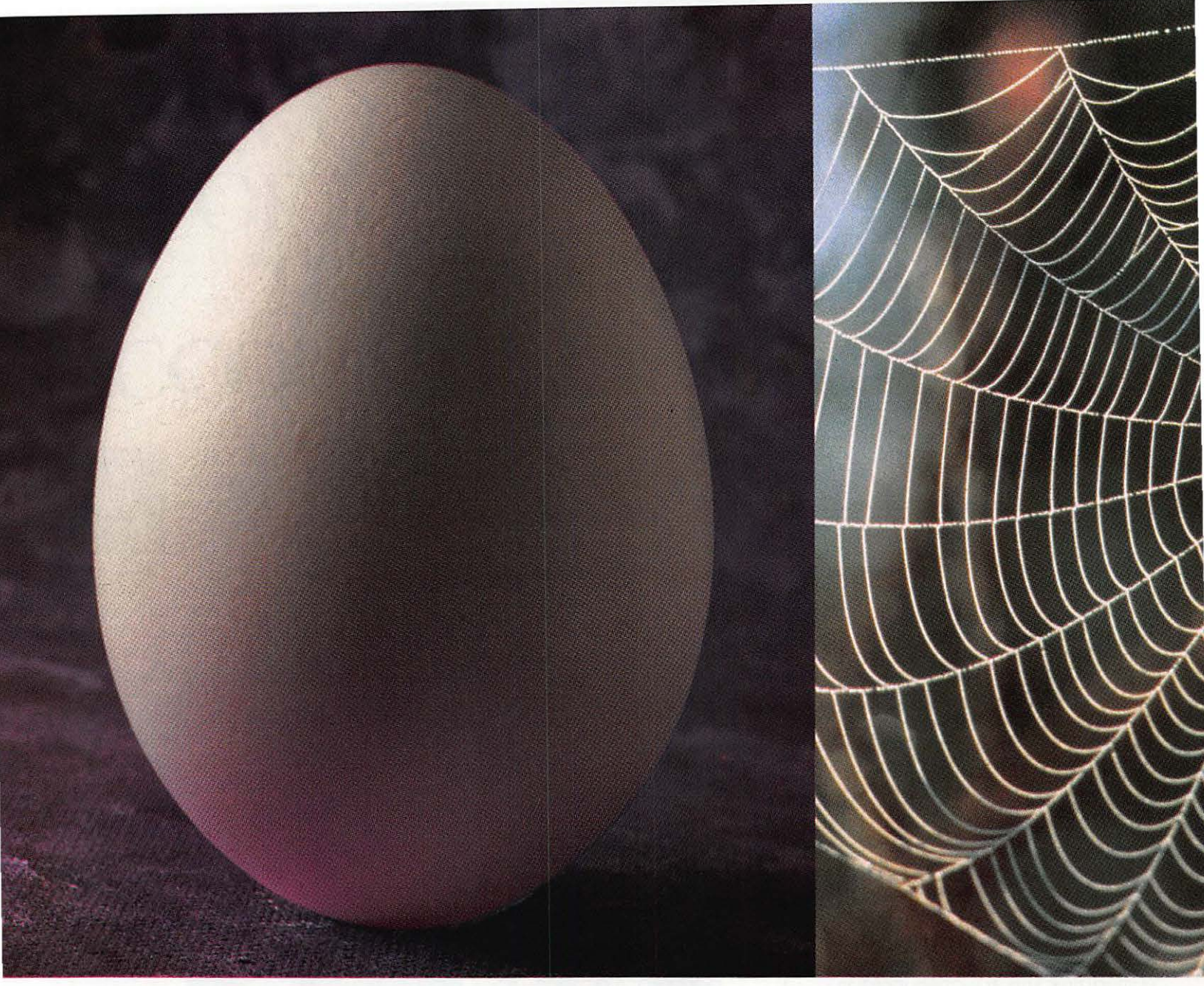

# It's the highest achi to be both beautiful an

In the field of nature, the design skills of the hen and the spider have rightfully earned universal acclaim.

In the field of desktop publishing software, the same credentials apply to Letraset, leaders in graphic design for nearly 30 years.

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**Steven Levy**

# Meditations on HyperCard

*The problem with HyperCard isn't HyperCard, it's what people are saying about it*

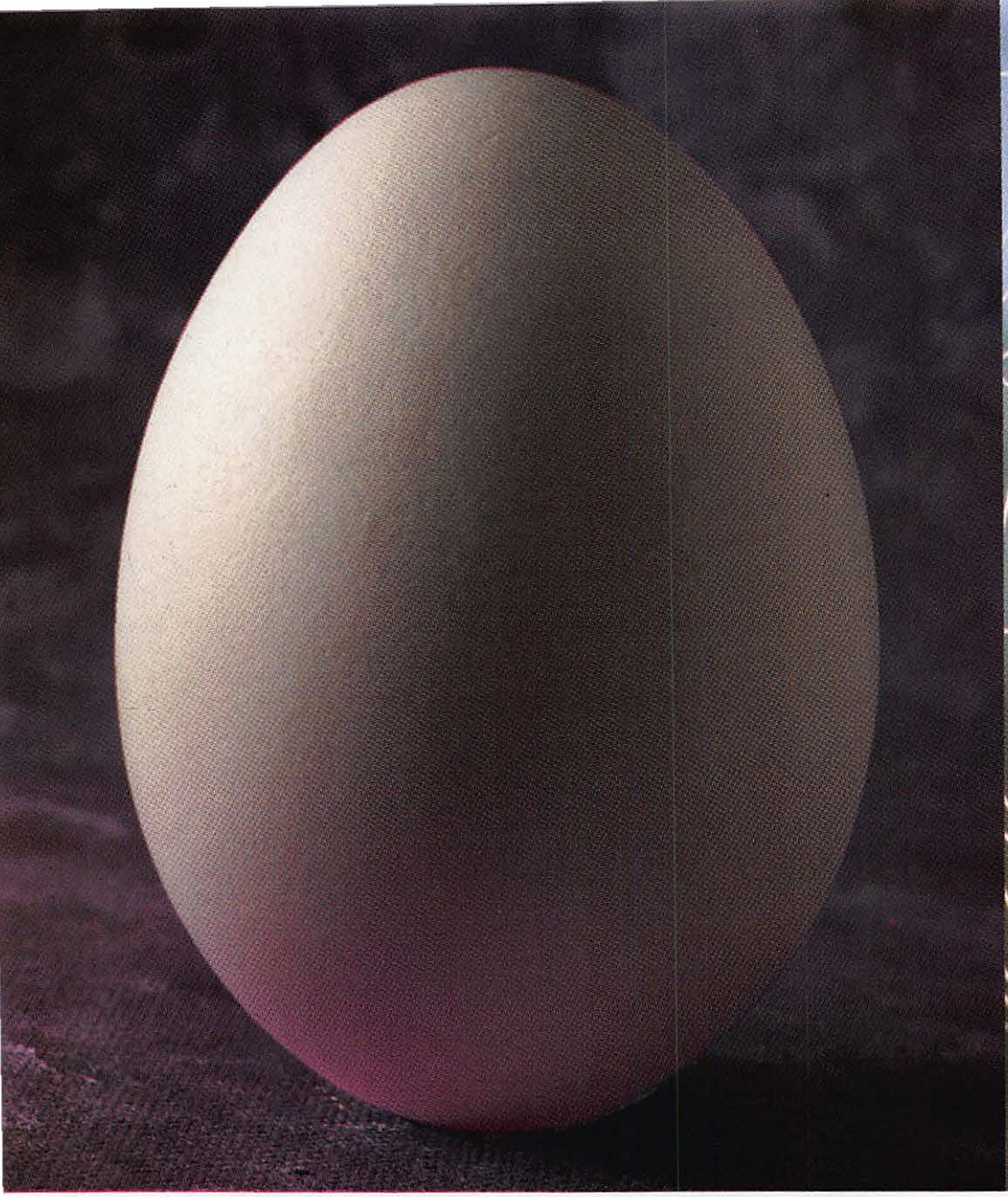
MAX SEABAUGH

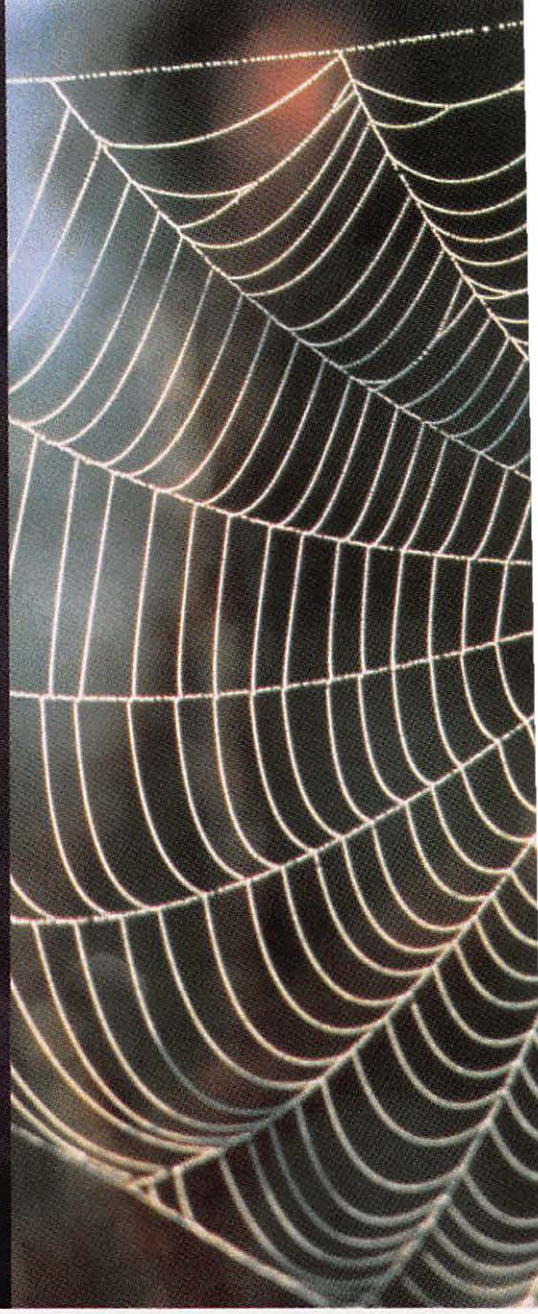
What is it about *HyperCard* that clouds people's minds? Has its developer, Bill Atkinson, concocted some ingenious mind-bending ray triggered when his code is fed into a Macintosh? I suspect so. Because when people first see *HyperCard,* the Program That Defies Category, they respond with near-hysterical enthusiasm. It's reminiscent of how experimenters reacted to ingesting LSD in 1957. In other words, you have no analogue for the experience; you're not sure how to handle it, but all of a sudden...you're seeing *God.* In no time, you are babbling about how the world is about to undergo a profound transformation as a result of this wonderful substance. And the next few weeks are intense times of personal experimentation and energetic evangelizing. This, you croon, awash in visions of hyperbuttons and stockpiles of stackware, is It.

I do not exempt myself from this rush of enthusiasm. Though I had heard noises about this wonderful new program, I was unprepared for Bill Atkinson's mind-blowing demo at the August Macworld Expo. In retrospect, I may rationalize why I was grabbing people by the collar and saying, "This is the greatest Macintosh thing since the Macintosh!" For one thing, I was waiting for something thrilling. There has to be more to life, I figured, than waiting for *WordPerfect* to ship. For another, Mr. Atkinson's programming virtuosity easily surpasses anything available since, well, *MacPaint.* The sheer speed with which his program whizzes through images and seeks out selected words is nothing short of astounding. And anywhere it was possible to insert a neat feature, a neat feature exists. There are more goodies in here than in *Raiders of the Lost Ark.* Finally, Atkinson really seems to have placed the complex capabilities of the Macintosh in the hands of nonprogrammers. With the mini-programming language HyperTalk, it seems that the rankest novice, with a little bit of tinkering, can devise a terrific application. Having once written a book lauding how the computer revolution conveyed to the masses the hacker's ability to change one's electronic environment, it is no wonder I swooned when I first saw *HyperCard.*

I did not go as far as some other communicants, though. Previous commitments prevented me from dropping out of society to create stackware. Nor did I proclaim,

*(continues)*





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as did John Sculley, Apple's leader, that *HyperCard* "shatters the barrier between a person's information-handling dream and its realization." That, considering the nature of dreams, is very heady stuff.

Sculley and many others here have fallen into a fallacy reflected by the misleading moniker of *HyperCard*—that the program signals the arrival of hypermedia, a tonic that will change the world by changing the way we deal with information. Just as some early LSD users thought the chemical would transform the world, some *HyperCard* mavens chorus with visionary fervor that the program ushers in this strange thing called hypermedia, which links all relevant information so the world's knowledge falls into place as easily as the click of a mouse. I'm more skeptical, and hereby urge that the rhetoric be toned down, so that *HyperCard* can find its rightful place as a useful, if mortal, program—and not have to bear the burden of a paradigm shifter.

### Hands-On HyperCard

By now most of you have probably had some hands-on experience with the program, which is free to all new Mac owners and only $50 to everybody else. Probably the first thing you learned was that your current memory was insufficient to deal with the program. While *HyperCard* runs with a megabyte of internal memory, another meg or so is required to run the program in synch with other programs—and only that mode provides the full benefit of *HyperCard*.

But, Steve, you ask—just what *is* that benefit? Fair question; I haven't really said what the program does yet, and for good reason. In Hollywood, the deal makers debate movie proposals in terms of whether they are "high concept." A high-concept idea is one that its proponent can easily describe in a sentence, preferably in a single clause. The higher the concept, the greater the likelihood that the project will eventually become a major motion picture. By that standard, *HyperCard* would never make it to treatment. Apple's own marketing has been vague, muttering about the "power of association" and promising all sorts of wonders.

In fact, it would be better for all concerned if people called it "a user-configurable information-handling tool" and left it

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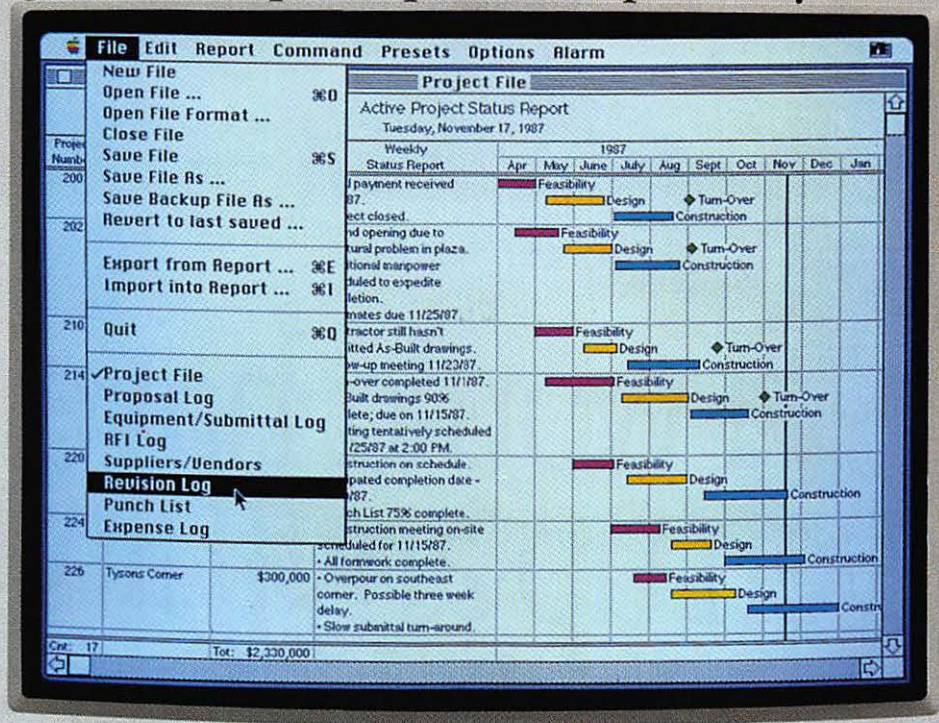


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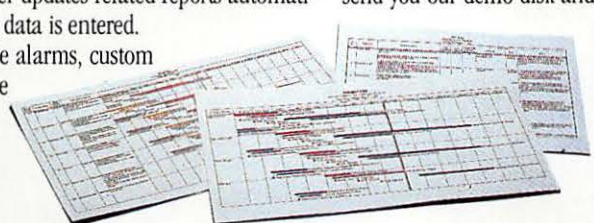

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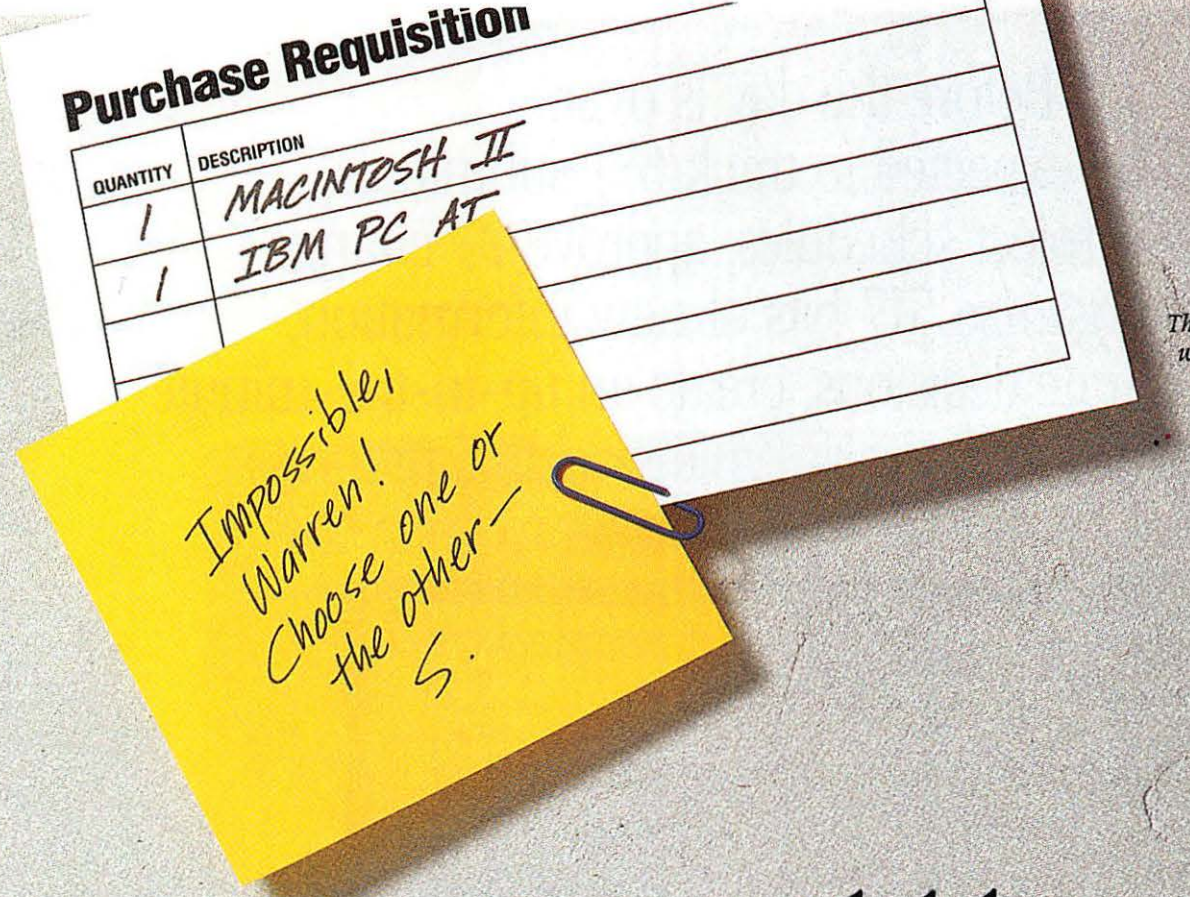


*The obvious solution was unrealistic.*

# "I would have given up anything to use a Macintosh, except my PC software."

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Then I searched everywhere for someone willing to loan me a PC in exchange for executive privileges. I was willing to give up anything, but I kept hearing No. Not interested.

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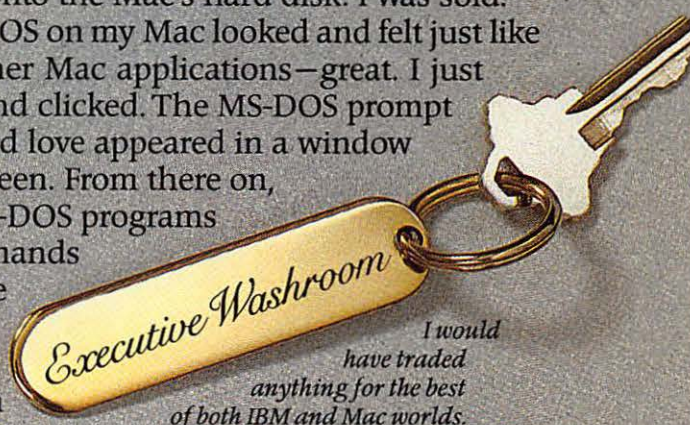


*I would have traded anything for the best of both IBM and Mac worlds.*

I even moved Macintosh files into MS-DOS, sometimes cutting and pasting parts from one environment to the other. And when I was finished with my PC and Macintosh files, I stored them both on the same Macintosh hard disk without any clumsy file transfer procedures to slow me down.

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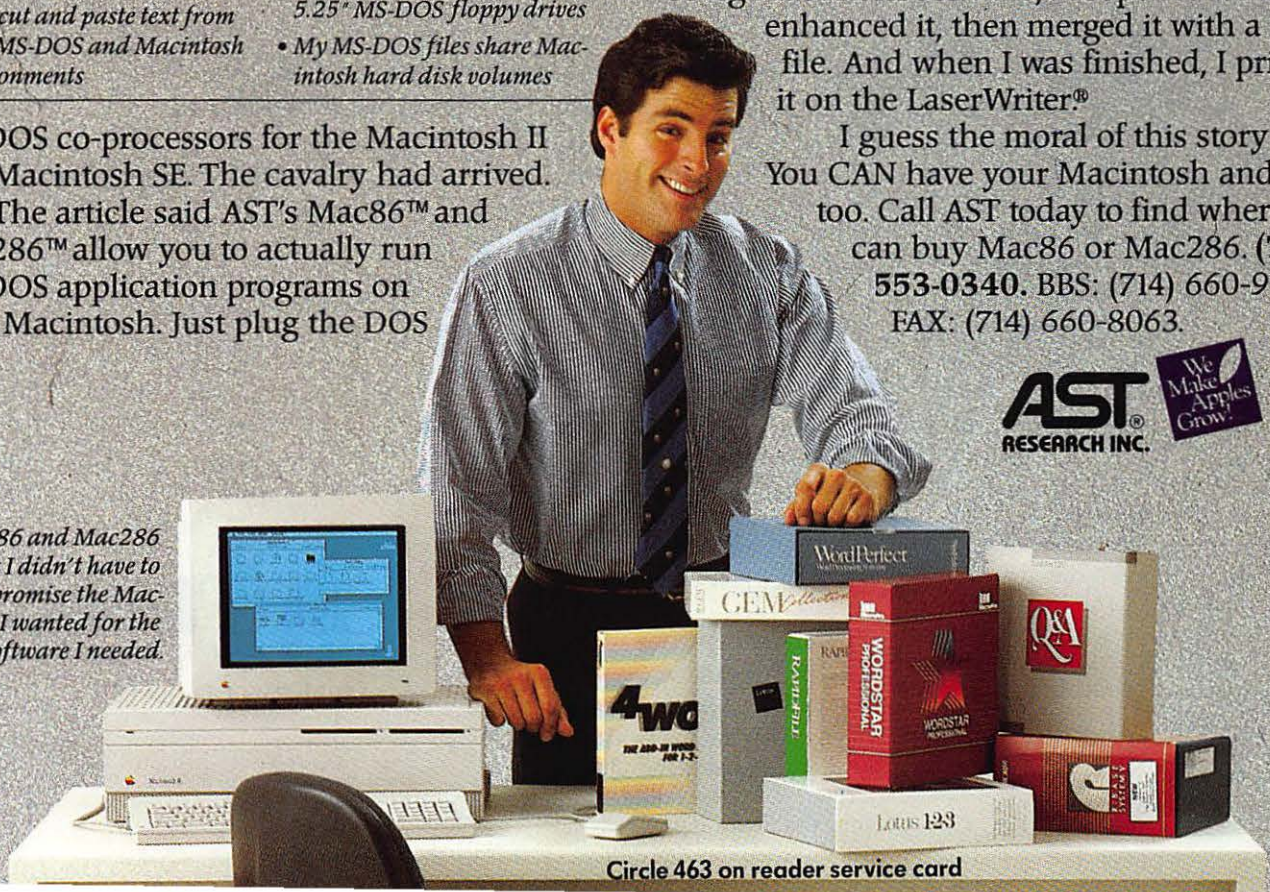


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at that. It is much more, of course, but when you start to explain the "much more" your eyes take on that Timothy Leary gleam. At its simplest, and also at its best, *HyperCard* manages information. The program's superiority to other data-management software is its recognition that information has more value if it can be manipulated into a larger universe than that of a single program. So while *Helix* and *4th Dimension* have more power and depth in some respects, *HyperCard,* in its ability to link with the outside world, is like the mouse that trips up the elephant.

To use *HyperCard,* of course, you need stackware. *HyperCard* without stackware is like Macintosh without software. The sample stacks included in the package lose their novel appeal very rapidly, and if you want to really play, you must buy or download new stacks or write your own. In my case, which I guess is typical, I first tried to modify some of the freebie stacks. I started with the Address stack and began playing around–designing my own custom cards with links to other stacks and programs.

One quibble here. While Atkinson is an original Macintosh wizard, oddly enough, the workings of *HyperCard* in some ways vary from the standard religion. The program opens to the Home card, which displays icons representing your tried-and-true stacks. This is akin to the desktop that greets you as you first start up the Macintosh. However, while we've all gotten used to opening Macintosh files by double-clicking on them, in *HyperCard* it takes a single click. And there's no Save command in *HyperCard:* the program automatically does that. While arguably a better way to do things (certainly a step towards idiotproofing), it does get confusing, since *HyperCard* exists side-by-side with the traditional interface.

### Talkin' HyperTalk Blues

That's a small complaint. The bigger problem I had was figuring how to get the information in my current "electronic Rolodex" (the MacDialer desk accessory from Borland's *SideKick* package) into the Address stack in *HyperCard.* Sitting in the press room at the Macworld Expo, I had watched Ted Kaehler, an Apple software engineer who worked on *HyperCard,* hack up a simple script (a HyperTalk program that controls a button, the thing that causes events to occur in *HyperCard*) to import information from a database to a stack.

*(continues)*


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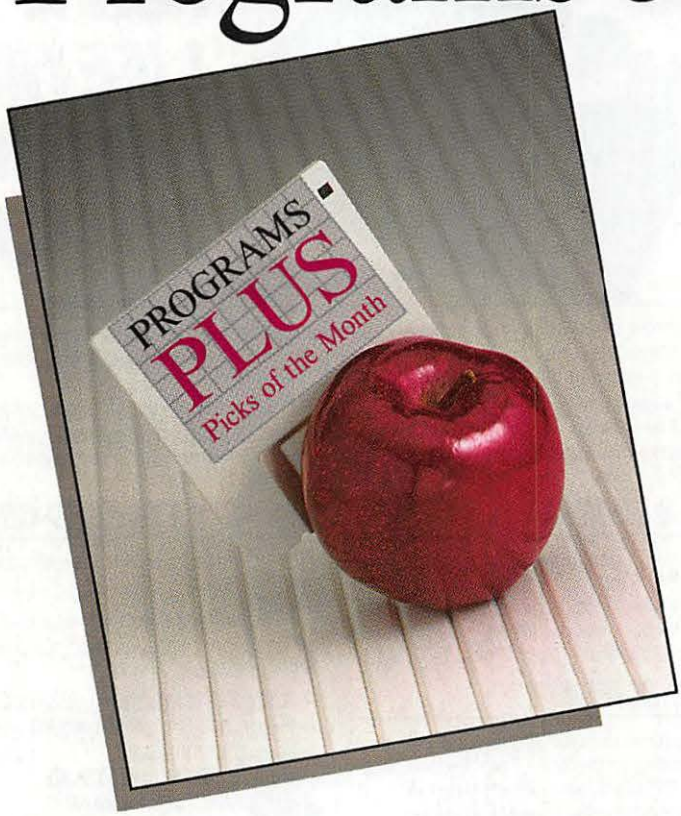
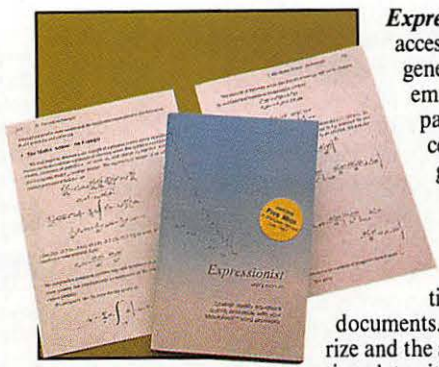
# Programs & Peripherals

## Picks of the Month




## Expressionist by Allan Bonadio Associates




***Expressionist*** is a unique desk accessory that allows you to generate typeset quality mathematical expressions to be pasted into any word processor or page layout program. *Expressionist* allows you to enter equations as easily as you enter text using the keyboard and icons to generate equation symbols to use in your documents. With nothing to memorize and the ability to re-edit your equations later, it's no wonder MacUser Magazine awarded FIVE MICE to this powerful yet simple program!

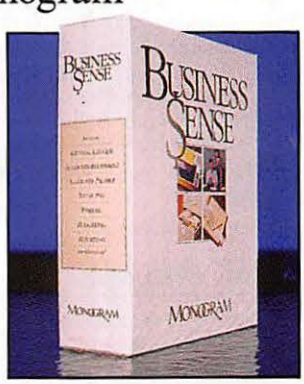
**Expressionist** ..... **46.**

## QuicKeys by CE Software

***QuicKeys*** is a keyboard enhancer for your Mac that allows almost anything you can do with your mouse and keyboard to be done with one keystroke. Just drag *QuicKeys* into your system folder, open the control panel, select a feature from the menu, press a key and...Zap! the feature is there. *QuicKeys* is powerful yet simple and includes *Quick Access*, a bonus program that will create and modify sets of keys and print keyboard templates for the functions you've created.

**QuicKeys** ..... **65.**

## Business Sense by Monogram

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**Business Sense** ..... **285.**

## Utility Software

| | | | |
|---|---|---|---|
| **ALSoft** | | Icon-It! *(Assign Icons to Menu Items)* | 40. |
| Disk Express 1.10 | 26. | Read-It! TS *(For Thunderscan)* | 89. |
| **Berkeley System Design** | | Read-It! O.C.R. *(For Image Scanners)* | 179. |
| Stepping Out *(Macintosh Screen Extender)* | 55. | **Software Supply** | |
| **CE Software** | | Suitcase or Power Station | 38. |
| QuicKeys *(Macro Program)* | ***Special*** 65. | **SuperMac Software** | |
| DiskTop 3.0 *(Portable DA Finder)* | 32. | SuperSpool *(ImageWriter Print Spooler Utility)* | 42. |
| CalendarMaker 3.0 *(Custom Calendars)* | 32. | SuperLaserSpool | 82. |
| **Central Point Software** | | Multi-User SuperLaserSpool | 199. |
| Copy II Mac *(Includes MacTools)* | 22. | Diskfit 1.3 *(Backup & Restore Utility)* | 54. |
| **Fifth Generation Systems** | | Sentinel | 82. |
| FastBack For The Macintosh | 59. | **TOPS** | |
| **Infosphere** | | Tops For The Macintosh 2.0 | 119. |
| MacServe *(Network Software)* | 164. | **Williams & Macias** | |
| LaserServe *(LaserWriter Print Spooler)* | 64. | myDiskLabeler | 24. |
| ComServe *(Modem Sharing Software)* | 124. | myDiskLabeler w/Color | 32. |
| **Olduvai Software** | | myDiskLabeler w/LaserWriter Option | 35. |
| DA-Switcher II *(Switch Multiple Sets of DA's)* | 25. | **Working Software, Inc.** Findswell *(Document Finder)* | 29. |

## Desk Accessory Programs

| | | | |
|---|---|---|---|
| **Affinity Microsystems** | | **Imagine Software** | |
| Tempo 1.2 | 54. | Smart Alarms & Appointment Diary | 35. |
| AffiniFile | 49. | **Solutions, International** | |
| **Borland** SideKick V2.0 | 69. | Multi-User Appointment Diary with Smart Alarms | 95. |
| **Cortland** Top Desk | 33. | SmartScrap & The Clipper | ***Special*** 35. |
| **Greene, Inc.** QuickDex 1.4 | 24. | | |

## Languages

| | | | |
|---|---|---|---|
| **Apple Computer** | | **Mainstay** | |
| MacPascal | 99. | V.I.P. *(Visual Interactive Programming)* | 85. |
| **Borland** | | **Microsoft** | |
| Turbo Pascal | 69. | Microsoft Basic Interpreter 3.0 | 62. |
| Turbo Pascal Database Toolbox | 69. | Microsoft Basic Compiler 1.0 | 119. |
| Turbo Pascal Numerical Methods | 69. | Microsoft Fortran Compiler 2.2 | 169. |
| Turbo Pascal Tutor | 49. | **THINK Technologies** | |
| **Consulair** | | Lightspeed C | 95. |
| Macintosh 68000 Development System | 59. | Lightspeed Pascal | 65. |

## Communications Software

| | | | |
|---|---|---|---|
| **Apple Computer** MacTerminal | 99. | **Think Technologies, Inc.** | |
| **Compuserve** | | InBox-Starter Kit V2.0 *(3 Personal Connections)* | 199. |
| Compuserve Starter Kit | 24. | InBox-Mac Connection | 69. |
| **DataViz** MacLink Plus with Cable | 149. | **Software Ventures** | |
| Microphone 1.1 *(Includes Glue)* | 119. | InBox-PC Connection *(Req. AppleTalk Card)* | 109. |

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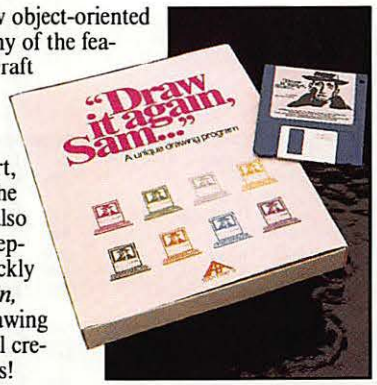
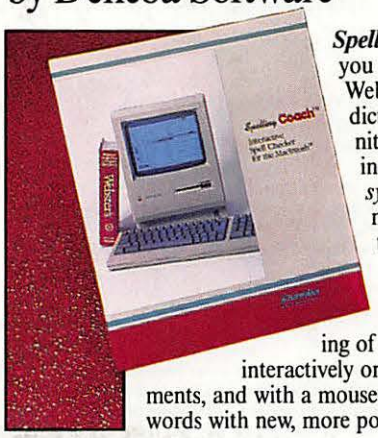



***"Draw it again, Sam"*** is a new object-oriented drawing program sharing many of the features of MacDraw and MacDraft but it's unique in letting you create your own limitless *text and graphics libraries.* Store and retrieve frequently used art, text, or logos with a click of the mouse. *"Draw it again, Sam"* also allows you to produce color separations or cell animation quickly and easily. And, *"Draw it again, Sam"* uses "Quick Draws" drawing modes to their fullest potential creating magnificent visual effects!

**"Draw it again, Sam"** ..... **95.**

### Spelling Coach Professional by Deneba Software



***Spelling Coach Professional*** gives you instant access to Merriam Webster's Concise 85,000 word dictionary with *complete* definitions. *Coach Professional* includes a thesaurus *(245,000 synonyms with definitions)*, a medical dictionary, a legal dictionary and even a 20,000 word geographical and biographical supplement. So if you're looking for the meaning of it all, use *Coach Professional* interactively or scan your completed documents, and with a mouse-click replace the original words with new, more powerful ones!

**Spelling Coach Professional** ..... **109.**
**Spelling Coach** *(spelling checker only)* ..... **59.**

### SmartScrap & The Clipper by Solutions International

***SmartScrap & The Clipper*** includes two desk accessories that enhance the way you deal with your clip art. *SmartScrap* is an improved scrapbook DA that allows you to see all your clip art by scrolling and lets you keep multiple scrapbooks on any disk. And, *The Clipper* is a great cropping and scaling tool that determines the dimensions of an area where a picture is to be pasted, reducing or enlarging it to the exact dimensions needed.

**SmartScrap & The Clipper** ..... **35.**

### MacSnap Internal Memory Expansions by Dove Computer Corporation

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**Ready Set Go! 4.0** ..... **279.**

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MacVision *(Digitizer)* 169.

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Transet 1000 Mac Accessory Kit 29.
InterBridge *(Connect Appletalk Networks)* 599.
**Migent**
Migent Pocket Modem *(ext. 300/1200 Baud)* 169.

**Prometheus**
Promodem 1200 *(Hayes Compatible)* 239.
Promodem 2400 *(Hayes Compatible)* 309.
Mac Pack w/Procom M and Cable *(Specify Mac or MacPlus)* 49.
**U.S. Robotics**
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**Ashton Tate** dBase Mac 1.0 295.
**Blythe Software** Omnis 3 Plus/*Express* 279.
Omnis 3 Plus Multi-User *(MacServe, Tops Network, Corvus, Appleshare or Hypernet 2-5 users)* 489.
**Borland** Reflex Plus 179.
**Chang Laboratories**
C.A.T. Contacts•Activities•Time 239.
**Microsoft** Microsoft File 1.05 110.
**Nantucket Software**
McMax *(dBase III Compatible)* 179.
**Nashoba Systems** FileMaker Plus 149.
**Odesta** Double Helix II 339.
Multi-User Helix 429.
**ProVUE Development** OverVUE 2.1 149.
**Software Discoveries** RecordHolderPlus 45.

## Business Software

**Apple Computer** MacProject 159.
**Bravo Technologies** MacCalc 85.
**Cricket Software** Cricket Graph 124.
Cricket Presents... 289.
Pict-O-Graph 105.
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**Microsoft** Microsoft Word 3.01 239.
Microsoft Write 109.
**MindWork Software** MindWrite 1.1 159.
**Symmetry** Acta V2.0 37.
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**A.L.P. Systems** MacProof 3.0 *(Requires MacPlus)* 125.
**Batteries Included**
Thunder! *(Interactive Spelling Checker)* 31.
**Deneba Software** Spelling Coach 3.0 *(Webster's/Medical/ Legal/Hyphenation)* ***Special*** 59.
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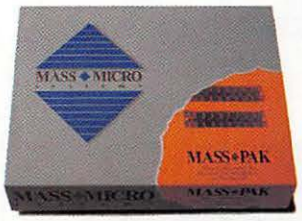


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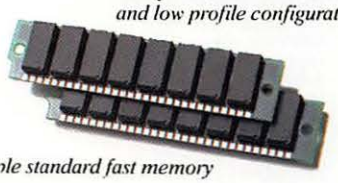

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Kaehler had no trouble doing this–he is a veteran wizard who earned his stripes at the famed Xerox PARC laboratory–yet it still took him a few passes through the script to get it right. To duplicate his work I would have to develop some prowess in HyperTalk and spend at least one afternoon of trial and error, eyes shifting from the screen to the tutorials in Danny Goodman's essential *Complete HyperCard Handbook.* An enjoyable afternoon, certainly, because I enjoy solving puzzles.

On the other hand, it was a step toward a commitment. Did I really *want* to become a Macintosh programmer? It's useful to customize programs to individual needs, and I fully intended to acquaint myself with the workings of *HyperCard* enough to do that. But I did not want to immerse myself in HyperTalk. I have plenty of hobbies and didn't want to add software development to the list. So I decided not to write an importer script. I figured that someone else would do it.

Which is exactly what happened. Within two weeks, I found one in the new stackware data library stored on the MAUG section of CompuServe. It had bells and whistles and certainly did the job, but I wasn't quite happy with the graphic setup, so I didn't send in the $10 fee that the shareware programmer requested. A week after that, I noticed that there was yet another script available that did the same thing with better graphics. There is a lesson here: you do not have to plunge into programming HyperTalk to benefit from *HyperCard.* Since it is so easy to program, somebody else will do it for you.

Ultimately, the stackware will determine how much *HyperCard* will become integrated into our work habits. One obvious use–as an all-around scheduler and personal data manager–has been addressed right off the bat. I have been noodling around with a prerelease version of the first full-blown stack of that sort, Activision's *Focal Point,* written by my *Macworld* colleague Danny Goodman. The program does what I expect it to. (Sadly, though, it lacks buttons that import data from other programs like–you guessed it–*SideKick.*) As I get more stacks and more skill in manipulating them, *Focal Point* may become the personal organizing tool I've been trying to kludge together for years.

### Hype and Hypermedia

But the ultimate scheduler is not what the *HyperCard* visionaries are touting. Instead they talk more about stacks on the model of Danny Goodman's other Activision program, *Business Class,* a hypermedia sampler of information on many countries, linked in various ways and easily accessible by world-map graphics. It's tops for getting a quick answer to a question like "What time is it in Sri Lanka?" but it doesn't provide the depth of information available in a dedicated guidebook.

*Business Class* suffers by comparison because it stands alone. In the coming age of hypermedia, the visionaries say, a program like *Business Class* will be part of a boggling network of connections. In its current version, when you ask what the intrapersonal customs are in a given country, *Business Class* gives you a few terse pointers. For instance: When in France, don't talk with your hands in your pockets. In the future, though, the hypermedia network will allegedly be in place. Asking the same question will link you to any French social bugaboo imaginable *and* provide the origins of those customs, and perhaps a passage from *Madame Bovary* to show the custom in action. Anything ever written about French customs, or customs anywhere, or Flaubert, or the history of pockets, will pop up on your screen. The information will be pumped into your home or office by an umbilical cord connecting you to some sort of giant World Brain.

There is a long line of adherents to this vision, beginning in 1945 with Vannevar Bush and continuing through Ted Nelson, who coined the word *hypermedia.* There has even been a Macintosh outpost in the field: Alan Boyd, the publisher of the *Guide* hypertext system. In his book *Odyssey,* Apple chairman Sculley has picked up the torch. He calls his contribution Knowledge Navigator, an intriguing, intelligent tool that will enable us to race through civilization's accumulated knowledge like supersonic pilots blasting through the stratosphere. Sculley also writes of his belief that *HyperCard* and its descendents will free us from the "constraints of a book's linear format": linking information "the way you think" in many cases will obviate the tiresome convention of beginning, middle, and end. Our fiction may begin to resemble novels like *Hopscotch,*

*(continues)*

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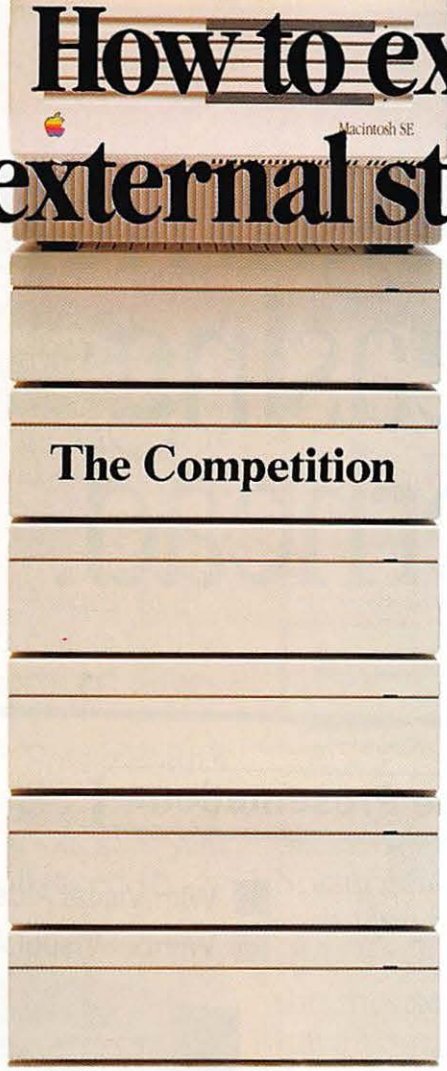


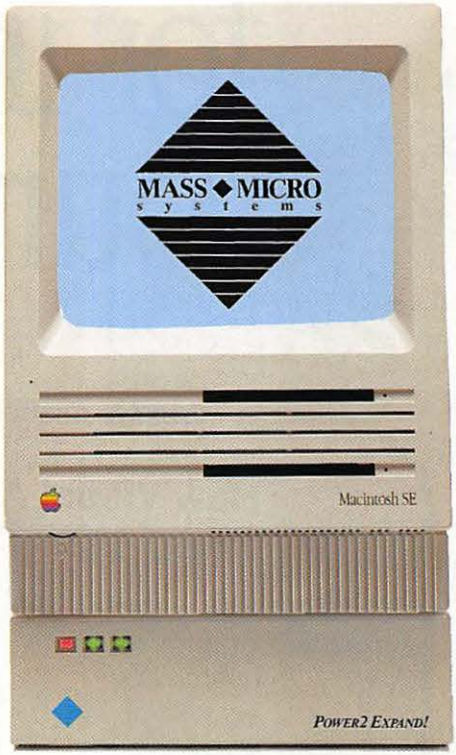


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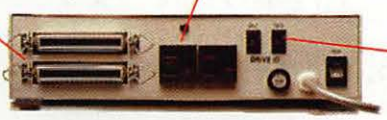

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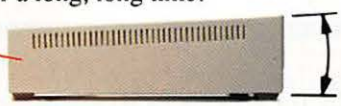

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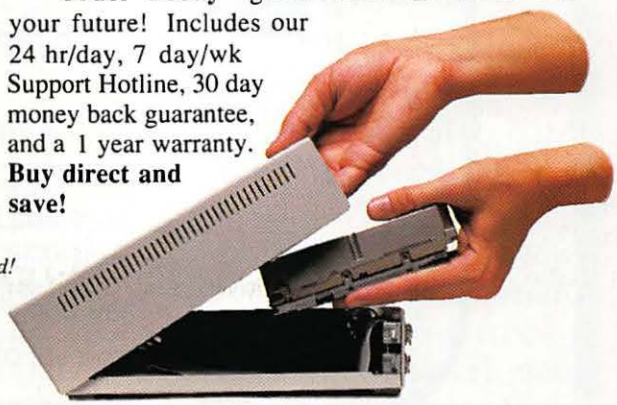

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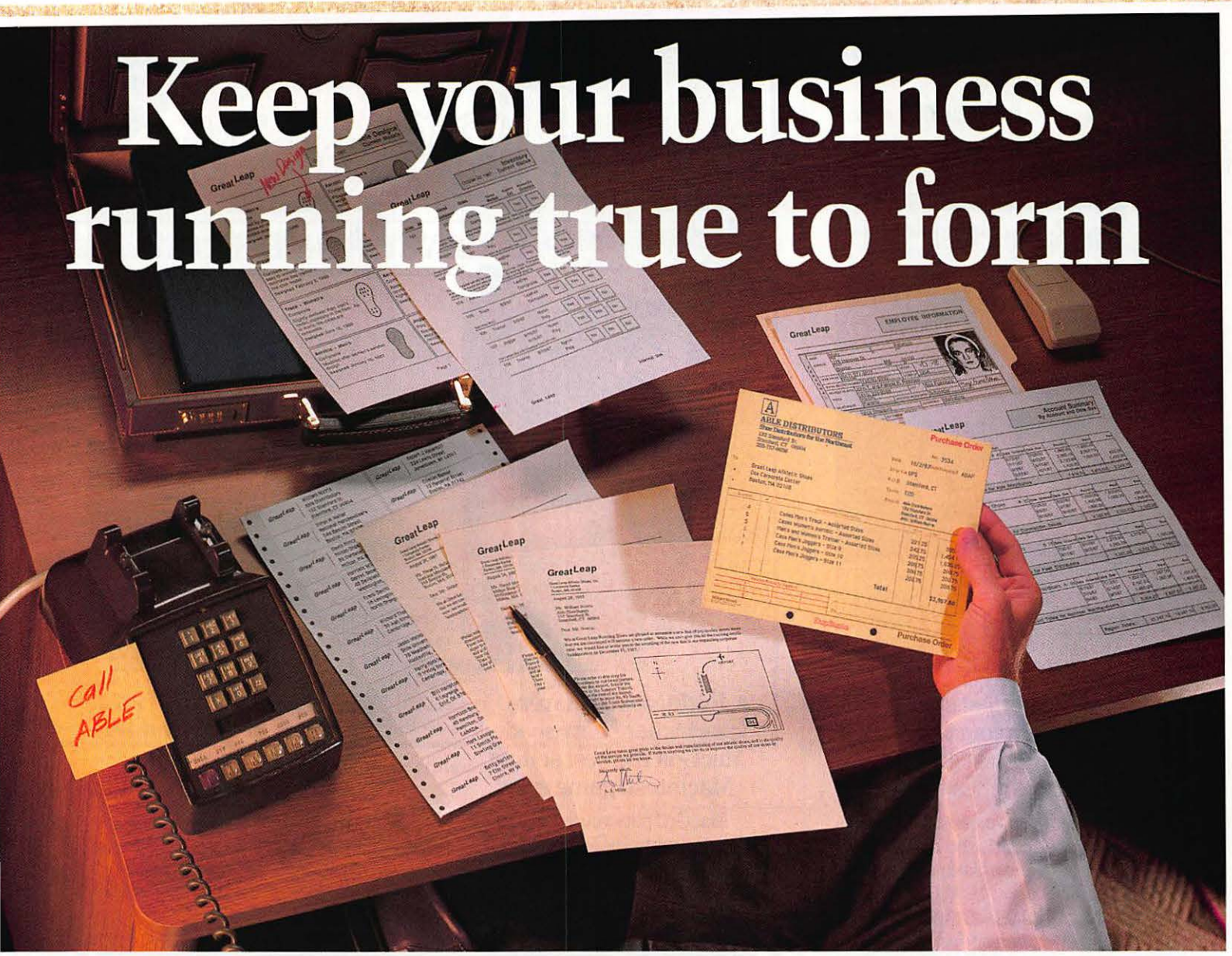


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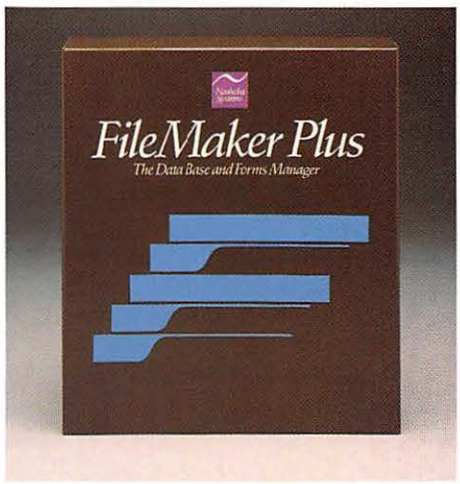


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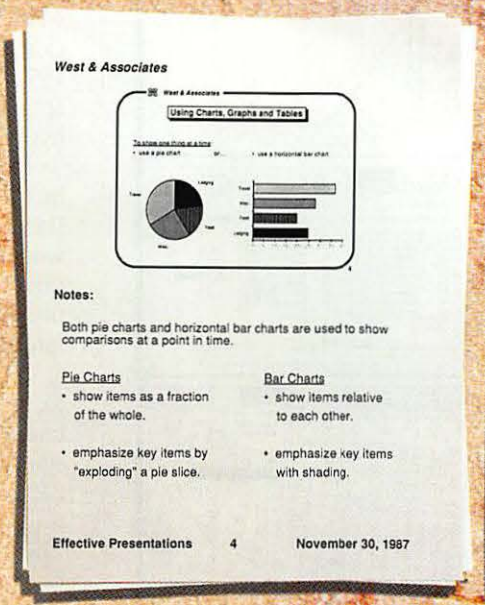


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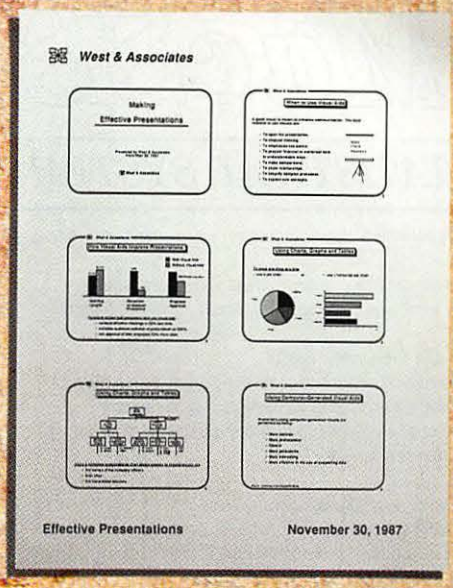


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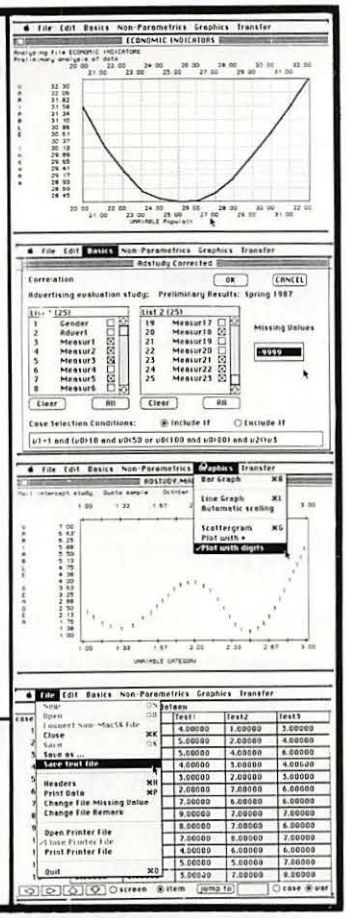

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Used in conjunction with either VersaTerm or VersaTerm-PRO, Tektronix graphics may be printed or plotted at high resolution to either a LaserWriter, ImageWriter, or an HPGL compatible pen plotter.

- *All Programs are Macintosh II and SE Compatible.*
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- *VersaTerm, VersaTerm-PRO and TekPrint Execute in the Background with the MultiFinder!*
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All Programs Designed for a 512K Mac, Mac-XL, 512E Mac, Mac Plus, Macintosh SE and Macintosh II.
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Circle 304 on reader service card

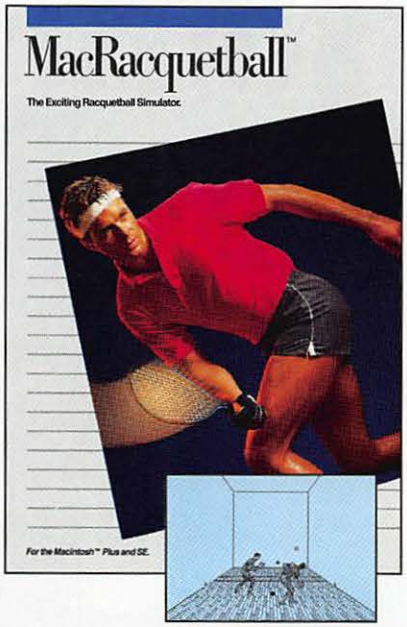


written by the South American writer Julio Cortazar. The Nobel laureate claimed the 155 chapters of his book could be read in any of several different sequences. In the hypermedia world, nonfiction books would not be read front to back, but would be blended into some World Information Bank, each passage linked in millions of ways to other relevant information. To quote Sculley, using this model "enables the user to summon up any information he needs, in the dosage he requires."

This strikes me as an unlikely scenario, at least on the scale that some commentators have predicted. An enormous task stands in the way of realizing the hypermedia dream: all the world's knowledge must be entered as data and put online. The problems of copyright and fair use must also be dealt with, and that means a near-infinite number of lawyer-hours. In a world where too many people are unfed and homeless, our space program is dead in the water, corporations are lean and mean, and every spare penny goes for tools of destruction, it is difficult to imagine this multibillion dollar project ever getting underway.

What's more, I do not mourn the loss. For raw data-gathering, the hypermedia dream would indeed be a boon. But when it comes to dealing with ideas, I wonder about the jet-pilot metaphor of racing through information. Sometimes it's better to walk. At that slower pace, one can actually *think* about the information pouring in, and not be so easily tempted to rush on to the next link. When push comes to shove, I prefer reading to navigating.

No doubt fast ways to access information–in what might one day be known as the *HyperCard* tradition–will change the way we do research and gain knowledge. But any changes in the near future will occur on a much more modest scale–for instance, "computer Filofaxes" like *Focal Point*. Or fast-searching front ends for CD-stored data. Or interactive teaching aids like the Help stacks for *HyperCard* itself. Meanwhile, let's not let the talk of information superhighways blur our vision of what is in front of us: a terrific program named *HyperCard*. It's here now, it's real, and we've all got a job ahead of us figuring out how to make the most of it. □

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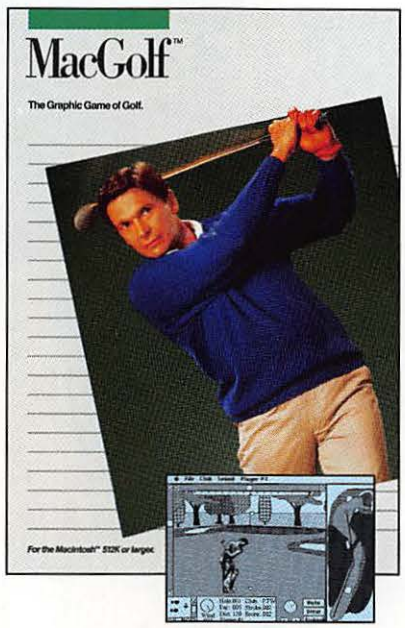


## Enthusiastic players everywhere have made MacGolf the best selling Macintosh game ever.

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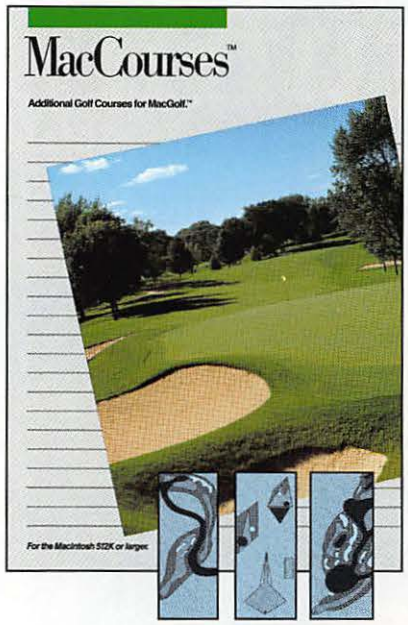
MacGolf is so close to the real thing it will improve your golf game. And by the time you've reached the eighteenth hole you'll know you've been in a real contest.




## When you have the best selling Macintosh game in the world, what do you do for an encore?

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If you liked MacGolf, you'll love what MacCourses brings to the screen. Four new 18 hole, par 72 courses: Cedar Creek, Golden Sands, Thunder Ridge and PCAI International. The fairways, traps, hazards, and putting greens of MacCourses are in a whole new league.

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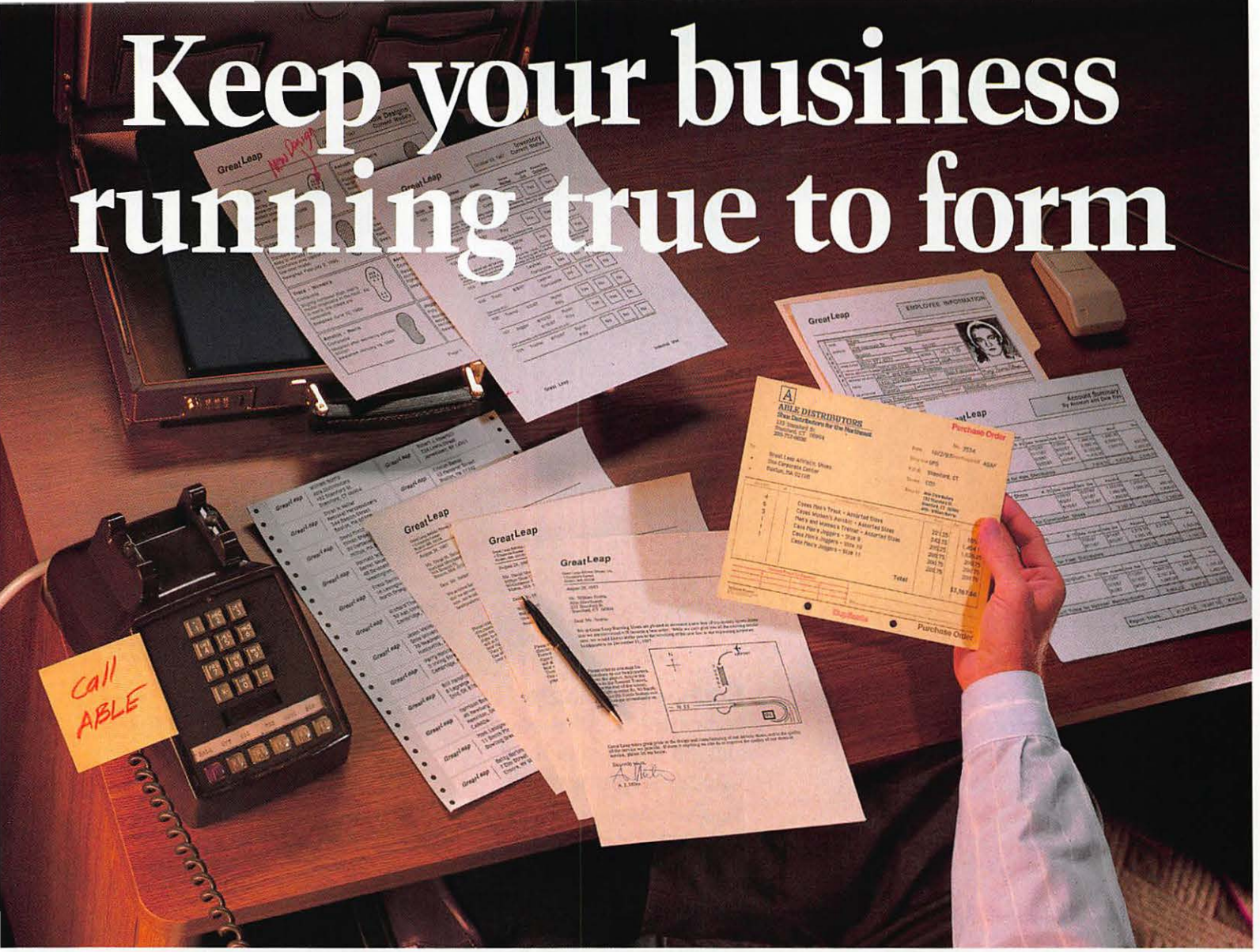


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Nashoba Systems is just as committed to FileMaker Plus today as we were when we first developed it. We'll continue to do all the things that have made it such a success: listen to our customers, provide outstanding free technical support, upgrade our product with the most advanced technology in an easily accessible form, and assure your satisfaction with our money-back guarantee.*

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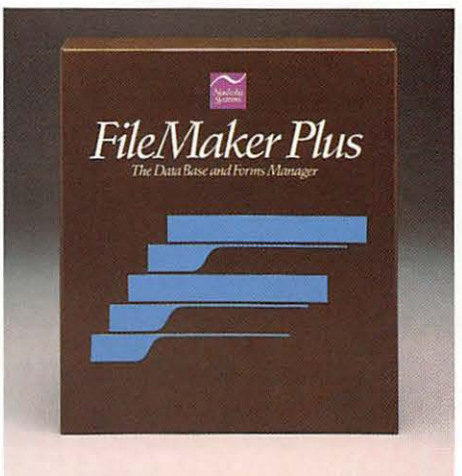


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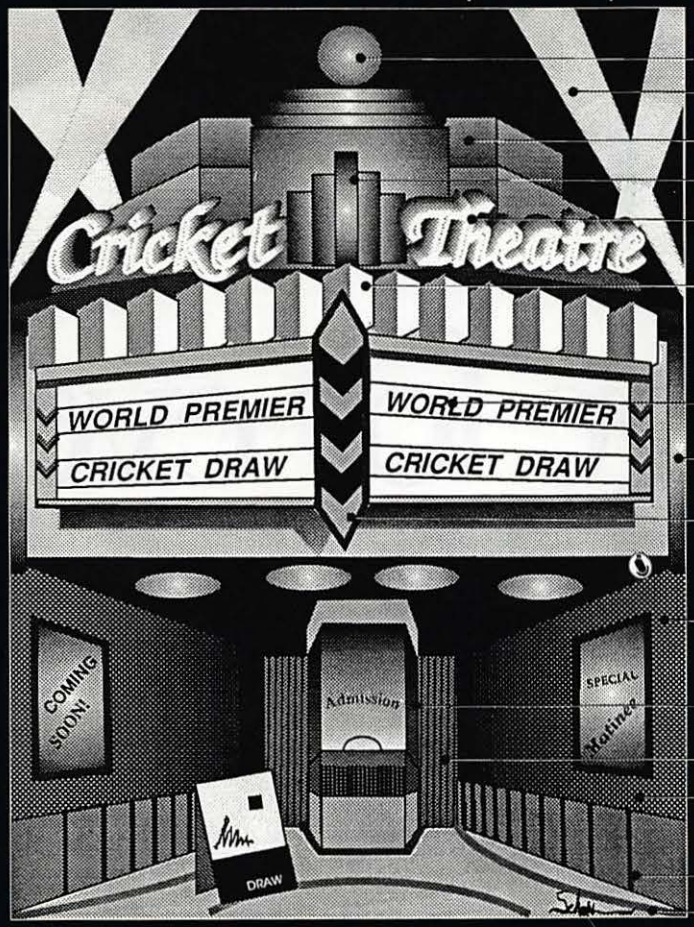


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### *Spectacular Special Effects*

*Cricket Draw's most universally acclaimed capability is its special effects generation. A quick glance at the example at left will give you a feeling for what can be accomplished with a little imagination and Cricket Draw. Graded Tones (fountains), Shading, Text on any path — all these effects and more are simple with Cricket Draw.*

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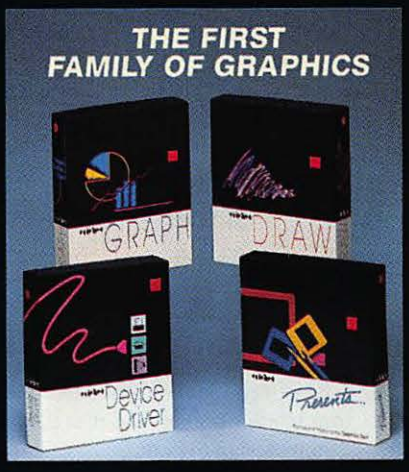


*When it comes to Macintosh graphics software, there's just one name to remember — Cricket Software. Your local dealer will be happy to introduce you to the entire family: Cricket Graph, Cricket Draw, Cricket Presents . . ., and Cricket Device Drivers.*

cricket software

Cricket Software, 30 Valley Stream Parkway, Great Valley Corporate Center, Malvern, PA 19355 (215) 251-9890

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*Performance without compromise.*

# Storage for every

MacWorld called the DataFrame "the Porsche of disk drives." Now you can put that performance to work for more users than ever. Because now there's a DataFrame configuration that's right for every kind of user. For example...

### *1. The Deserving User: DataFrame XP 30 Hard Drive DataFrame XP 60 Hard Drive*

Who deserves a Mac™ with DataFrame's productivity-boosting performance? *Everyone.* That's why DataFrame is the best selling hard disk drive next to Apple.® Compare, and you'll find that DataFrames are the *fastest* drives for the Macintosh. That they give you 50% more storage for your storage dollar. And that they offer the most reliable, elegant system design to boot.

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Worth over $500? Yes! Because all these packages purchased separately total over $500. SuperSpool and SuperLaserSpool mean long print jobs don't tie up your Mac. DiskFit makes backup a snap. Sentinel makes encryption easy for sensitive files.

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Networks need fast storage, so users don't have to wait. And they need easy backup, for disaster prevention.

Solution: The DataFrame XP 60 + 40, with 60 Mb of fast storage, and our ultra convenient, industry standard DC-2000 40 Mb tape drive.

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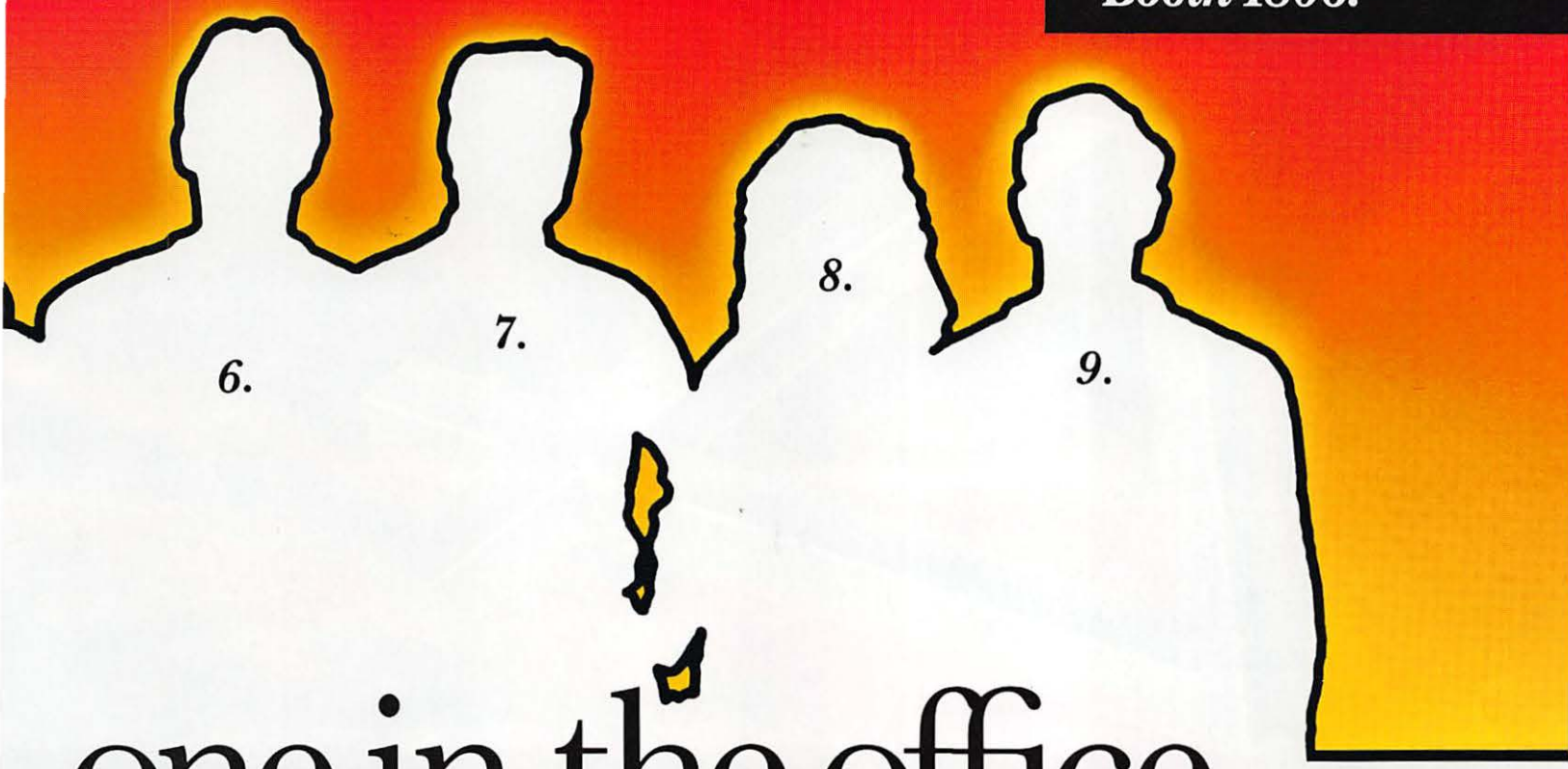
*See us at MacWorld Expo Booth 1806.*




# one in the office.

### *5. The Intensive Mac II User: DataFrame XP 150i Internal Drive.*

For people who want all the performance a Mac II™ can deliver: Here is the biggest capacity drive that fits into the Mac II, and the fastest drive, bar none!

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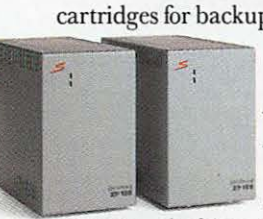

### *7. The Engineer (Or Scientist): DataFrame XP 105 Hard Drive DataFrame XP 150 Hard Drive*

Those needing big storage and fast response will appreciate these two DataFrame systems—the biggest storage that you can attach to any Plus,™ SE™, or II. And, unlike the ungainly boxes that house most large drives, DataFrames offer amazingly small, convenient packages.

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Relief for the office problem solver: Our designed-in reliability and quality. Superb documentation. And our responsive hotline that delivers answers fast.

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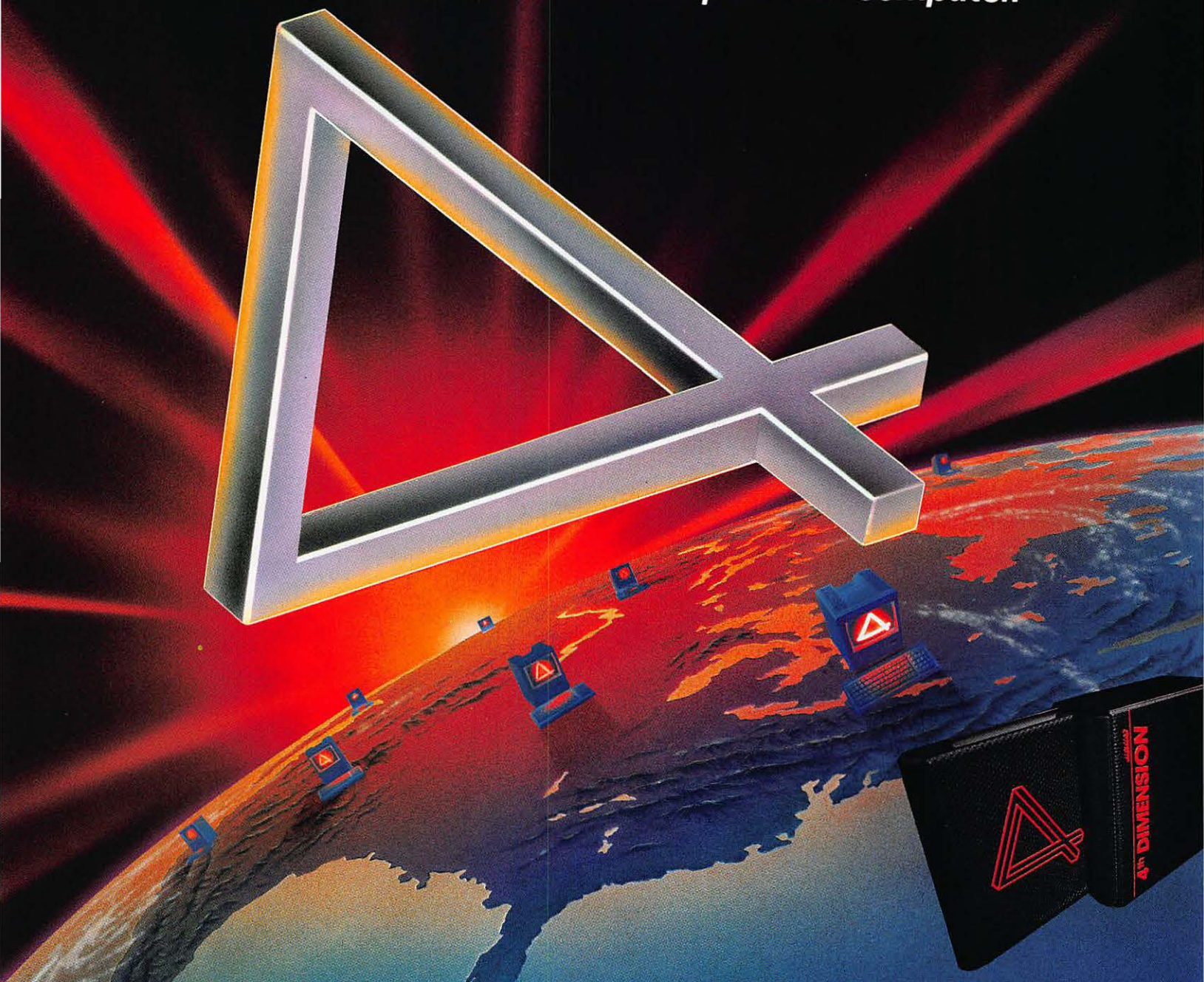
## The most powerful database for a personal computer.




**4th DIMENSION™ is a multi-user relational database for Macintosh™ that provides more power than any other database for a personal computer.**

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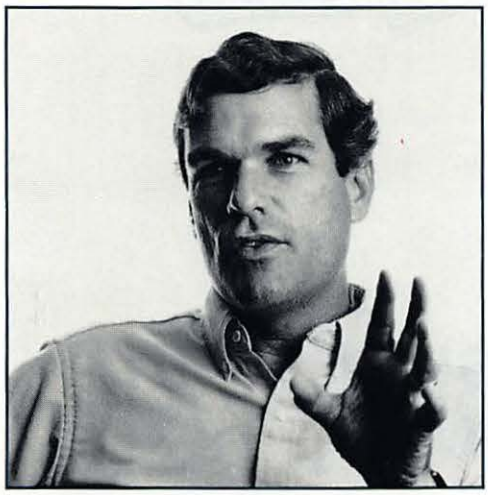
# Verbatim

## *An interview with Charlie Jackson, president of Silicon Beach Software*



*Charlie Jackson is a native son of San Diego, the offspring of a Navy chief. As a commissioned officer in the U.S. Marine Corps Reserve, he has been a competition rifle- and pistol-shooter on the Marine Reserve teams. Jackson has a bachelor's degree in Near Eastern Studies from UCLA—an interest that began during his years as a high school student in Istanbul—and a master's degree in Linguistics. He speaks French, Turkish, and Greek. Silicon Beach Software grew out of his work with the San Diego Macintosh Users Group, which he founded. He started the company in 1985 and has built it up to a $5 million per year operation.*

**What did you do first to start Silicon Beach?**

I designed our first product, *Airborne,* with Jonathan Gay, a 17-year-old who had won a state fair award for his Apple II programming, and he developed the game.

One day I was discussing what sort of a start-up screen *Airborne* should have with Eric Zocher, the University of California at San Diego computer science student who became our vice president of software development. We wanted a picture of an Airborne trooper snapping a salute. We thought it would be neat to have him say "Airborne, *sir!*" Eric told me the Mac could do digitized sound, and I lit up. We got some sample sounds from my former professor at UCSD, and Eric programmed the Mac to play them. We put the first digitized sound on the Mac. I spent the next few days calling people up and holding the phone next to the Mac speaker—it blew them away.

**That was before *Macintalk?***

I think *Macintalk* was available from the Mac's earliest days, but it did speech synthesis from text. We took real sounds, sampled them, and played them back over the Mac. But that was only the first step. Once we knew how to make the Mac play one waveform for sound, we realized that we needed to play more than one sound at once. In *Airborne,* for example, the helicopter blades make their sound and guns fire at the same time.

We had to find a way to make sound waves additive, because the Mac can only play one waveform at a time. Let me give you some background on this. Digitized or sampled sound consists of numerical data that can be plotted on a graph in the shape of a wave. Each sampled point is a bit of data on that wave. The Mac can only play *one* waveform at a time, using the digital-to-analog converter built into the hardware. Now, a single waveform can represent lots of different sounds going on at the same time, but for a game we had to sample each different sound separately so we could replay whatever was appropriate to match the actions on the screen. So we combined two different waveforms mathematically into one waveform, producing a combination of the two sounds.

It took Eric Zocher two months to do that. We had pioneered digitized sound on the Mac. Some games today, like *MacGolf,* play back a single recorded sound. But we had found a way to re-create more complex sounds and let the user manipulate them.

**What else have you done with sound?**

Eric came up with a good sound-compaction technique that we started using with *Enchanted Scepter.* We used it in *Dark Castle,* which has 72 individual digitized sounds. Fitting those sounds in with the game on two 400K disks would never have worked without the compaction.

**When did work begin on *SuperPaint?***

Immediately after *Accessory Pak,* in mid-1985. At one point we had paint tools in the *Paint Cutter* module, but we took them out because I wanted the best cut-and-paste program, not the worst paint program. *SuperPaint* took almost two years. Bill Snider did *SuperPaint.* Although Eric worked a little on all of our programs in that period.

*(continues)*

PHOTOGRAPHS BY WILL MOSGROVE

# "Can a Macintosh lover survive in an office that runs on Wang?"

Introducing MacLink*Plus/Wang VS* from DataViz, the workstation emulator that provides a Macintosh user access to Wang applications, word processing, data processing, electronic mail and file transfer.

**"It's a whole new system to learn, right?"**

Wrong. It works just like a Wang, but with all the friendly Macintosh features. All Wang functions are available through pull-down menus, the familiar Macintosh mouse and the standard or extended keyboard.

**"And what about file transfer & translation?"**

Exchanging information is a snap. You can transfer a Wang WP document to your Macintosh and work in Microsoft Word or MacWrite. And it works the other way, too.

**"Good enough. But if I want to connect with a Wang PC, or even an IBM PC..."**

No problem. MacLink*Plus/Wang VS* connects with either one, and includes a "library" of more than 25 different data translators, such as Wang WP, WordPerfect, Microsoft Word, MacWrite, DCA, dBase, Lotus, and more. Works with the Apple File Exchange utility, too.

Ask your Macintosh dealer about MacLink*Plus/Wang VS*, or call us direct at (203) 866-4944.

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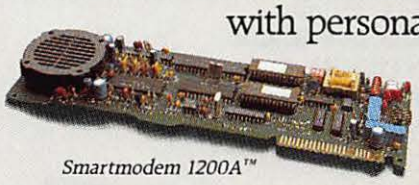
Our idea of "Hayes Compatible" has nothing to do with other modems and everything to do with personal computers. Which is the reason why Hayes modems are compatible with over 100 different personal computers, including all Apple® computers.



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For the Apple II, II+, IIe, IIc and IIGS, we offer the Smartmodem 2400™ and Smartmodem 1200.™ Or the internal Smartmodem 1200A,™ a modem that plugs into Apple expansion slots for fast, economical 1200 bps operation. And our new Smartcom I,® powerful menu-driven software with autodial/autoanswer and XMODEM protocol, brings out the best in both Apple computers and Hayes modems.

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Last but not least, there's another feature that Hayes 2400 and 1200 bps modems offer that will make them even more compatible with Apple computers, and that's a new low price.

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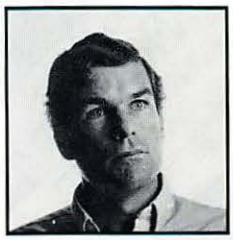

*I sense market opportunity when I hear other people saying, "Boy, that's hard to do."*

**How did the company grow?**

We had only five people in the company in the fall of 1986, after we brought out *World Builder, Dark Castle,* and *SuperPaint.* Our biggest problem then was money. The market was bad, and people were leaving the business. The Mac Plus had taken off that summer, but there were problems. First Software went into bankruptcy, and we took a terrible hit from them. I refinanced the house and obtained a small outside investment.

We didn't exhibit at Macworld Expo that summer, and people thought "Uh-oh." But we were taking care of our debts. We told everyone what we were doing, and they were all patient.

**Then *Dark Castle* came out?**

Right. Mark Pierce, one of the original MacroMind guys, began working with us a bit as an artist, and he turned out to be a talented game designer. I had a vision for the game, but no details. Mark took that vision and focused in on a theme and then took over the design completely. It was really hard to create what we have in that game, but that's where I sense market opportunity–when I hear other people saying "Boy, that's hard to do."

I've always felt that people must get something for their money. *Dark Castle* takes a long time to master–maybe even months of play, not weeks. We opted for a more difficult game that would provide a greater challenge.

*Dark Castle* started out slowly, mostly by word of mouth, then in its third month we began selling thousands of copies per month. Since January 1987 it's been a steady big seller, and without copy protection.

**How many have you sold?**

About 30,000. Our new game, *Beyond Dark Castle,* will help that continue. You don't need one to play the other, but they will help each other's sales.

**What is the new game?**

*Beyond Dark Castle* is a sequel to *Dark Castle,* with different rooms and new features. And full-screen scrolling, which is a first on the Mac.

**What is the future of games on the Macintosh?**

I hope they get better and better. There is terrific stuff to do on the Mac II, with color and multiple screens, but it will take a lot of resources to develop and there aren't so many Mac IIs out there yet. I know Silicon Beach will not do any more games.

**But you're the premier game builder for the Mac today.**

Well, we make money in that market, but how much longer? There is the issue of resources–the use of our available talent. I would rather put our resources into designing and testing graphics and productivity products. Products for the business market. Not that we don't *want* to continue with games, but we can't afford to. Not if we want the company to be successful over the long haul.

I didn't realize it at first, but to succeed as an entertainment software company you have to be on all computers–the Apple IIGS, the Amiga, and others–but for various reasons we didn't do that.

My initial plan for Silicon Beach was to do software for the Macintosh. The original business plan: start with games and then go into productivity software. A game was a good vehicle for an introduction to the market; games always sell if they're good. What if we had started with a database? Then we would have had all of those competitors. We had to be careful to enter the market where there were no major players. And we had to make money quickly, so games made sense.

*(continues)*


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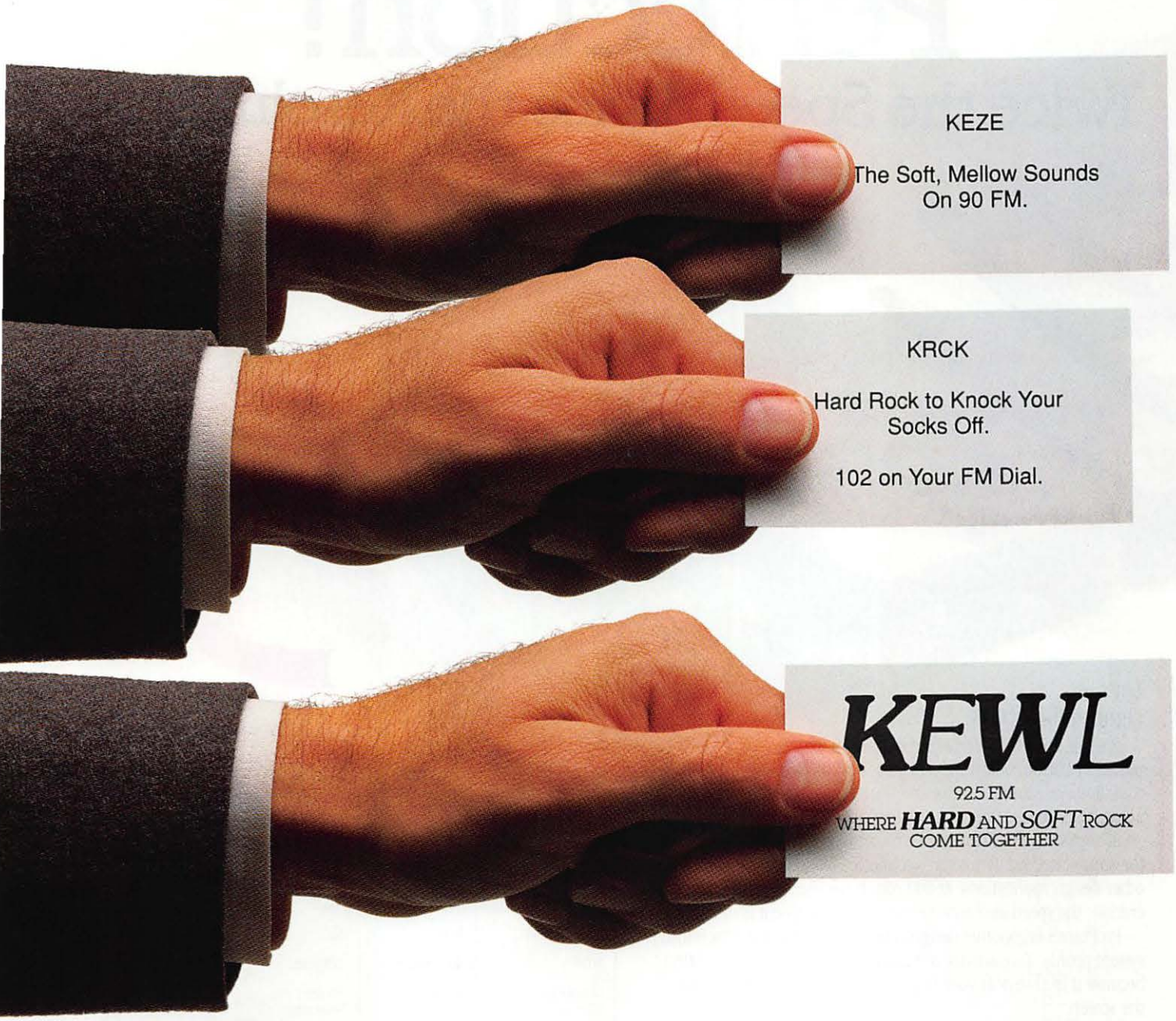


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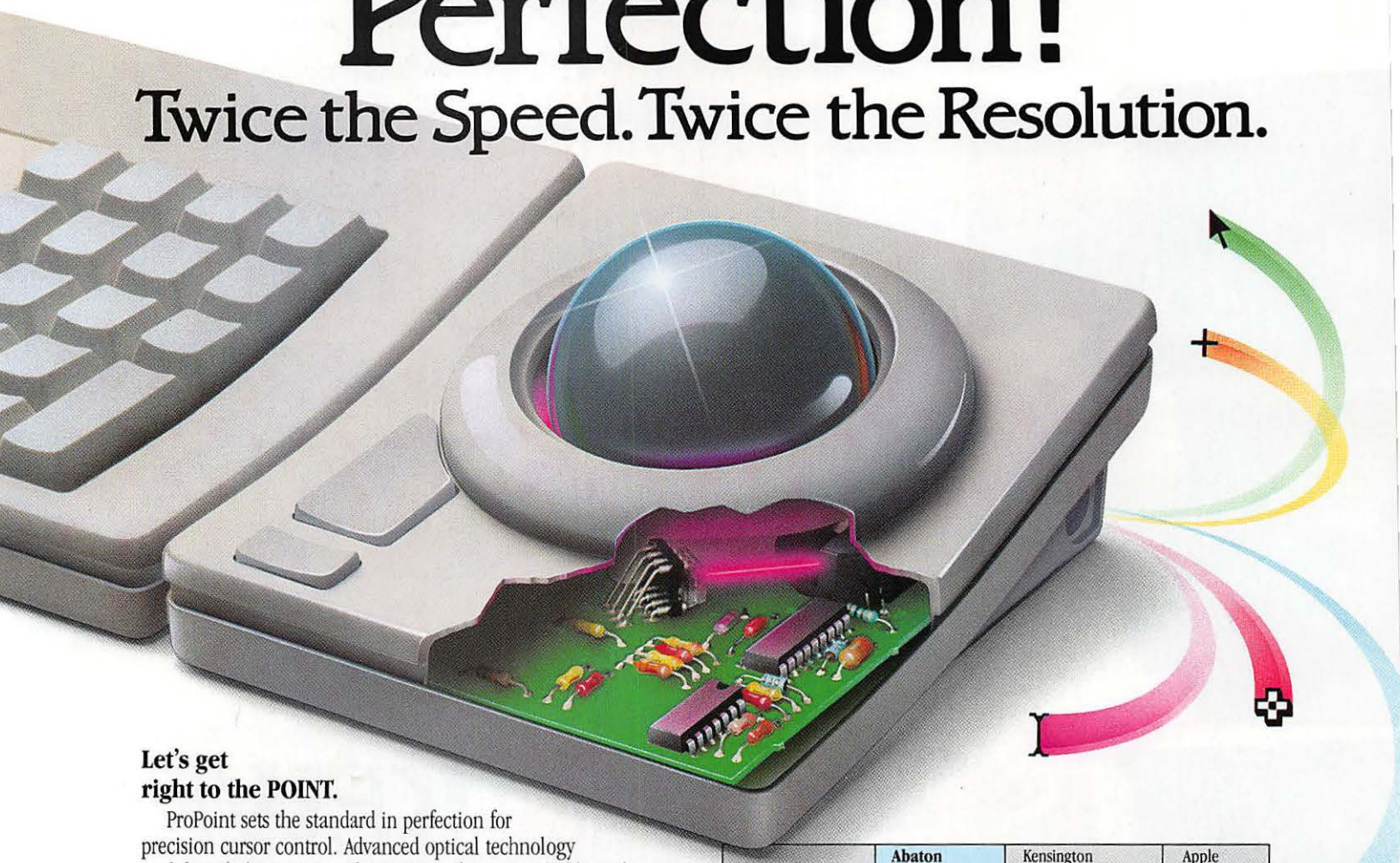

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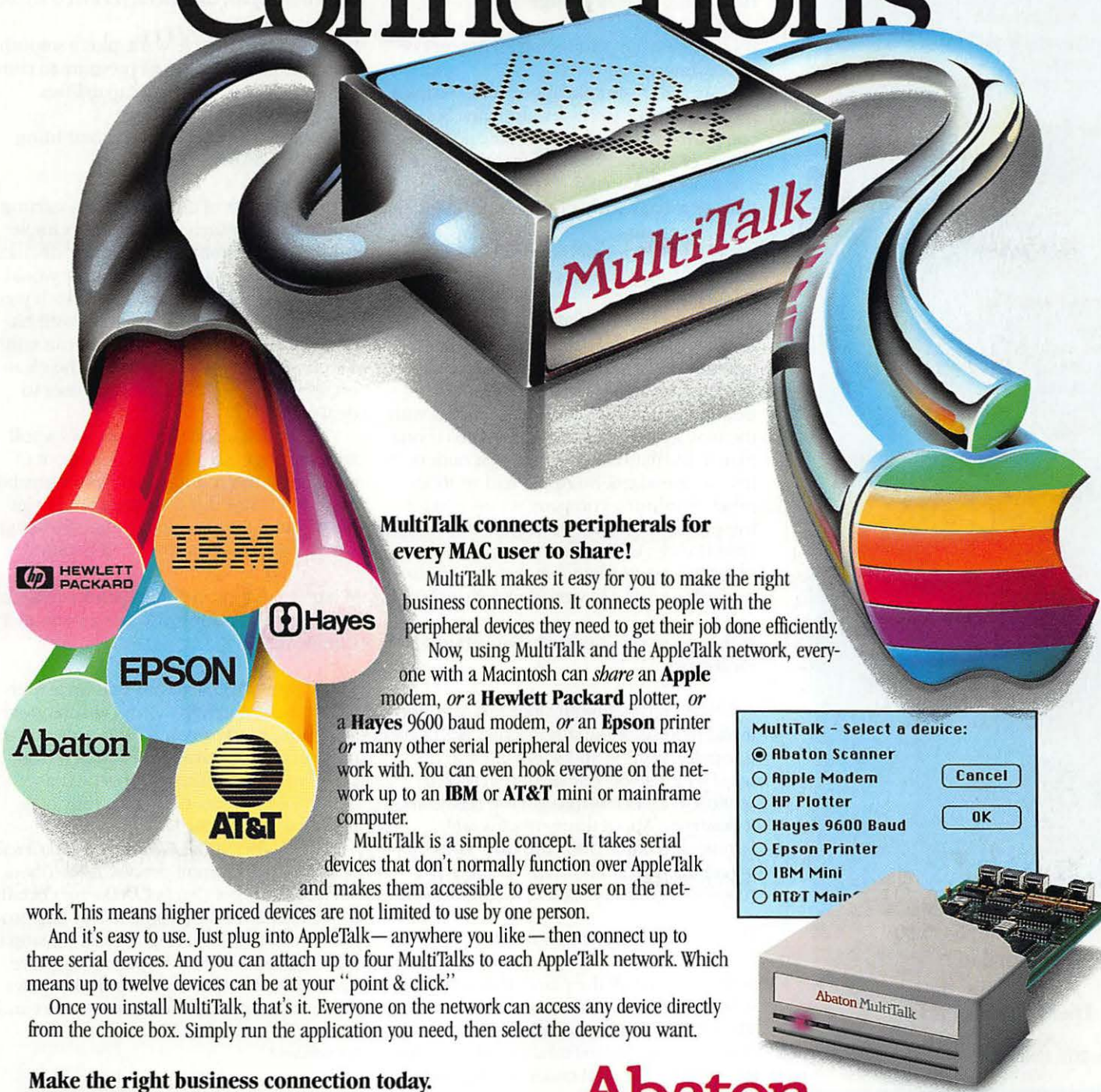


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MultiTalk is a simple concept. It takes serial devices that don't normally function over AppleTalk and makes them accessible to every user on the network. This means higher priced devices are not limited to use by one person.

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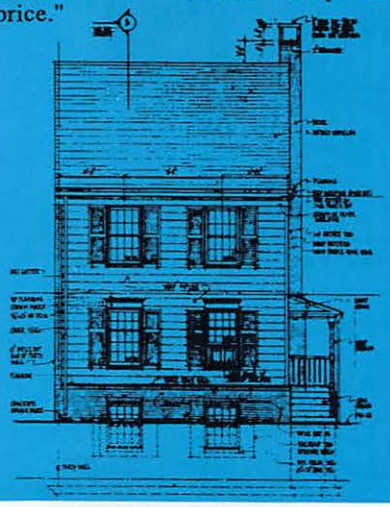

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*In the past the party line was that the Mac is too easy to require training, but things are more complex with the new machines.*

**How is *SuperPaint* doing?**

It's our mainstay, producing 70 percent of our revenues.

We will have sold about 50,000 copies by the time this interview appears. For comparison, Aldus has sold only 60,000 copies of *PageMaker.* In fact there are only a few–*Word, Excel,* the Apple products–that are more widely distributed.

**_SuperPaint_ is one of the products Apple selected for its training program. How does that work?**

Apple has decided that some end-user training is useful. In the past the party line was that the Mac is too easy to require training, but things are more complex with the new machines, and Apple is also trying to match what IBM does through outlets like Businessland. So Apple had an independent training company set up labs for five products: *SuperPaint, Microsoft Word, PageMaker, Adobe Illustrator,* and *PowerPoint.* It's significant to us that *SuperPaint* was selected as a key product for the Mac.

**Is there a rivalry between *SuperPaint* and *FullPaint?***

*FullPaint* has been out since last May, and it had months of initially strong sales. It had good distribution and was a big step forward when it was released, so it took a while for *SuperPaint* to get the recognition it deserves. About three months after *SuperPaint* came out, *FullPaint* sales began to decline. After about six months it reached its current level of negligible sales.

**How do you know that's true?**

Well, you can call the places that sell software, or you can talk to the distributors. They'll give you the broad trends in product sales. And *SuperPaint*'s on the hot lists. We also ask the mail-order vendors how it's doing. We hear that *SuperPaint* has been outselling *FullPaint* 20 to 1.

**Why has *SuperPaint* been received so well?**

It has features people want, plus a smooth interface–and it's the first program to combine both paint and draw capabilities.

**What were the problems in combining those two capabilities?**

There were lots of difficult issues, starting with what approach to take. For example, would the program have separate, distinct layers for painting and drawing, or would it take a draw-based approach, in which you essentially have a draw program with bit-mapped objects whose dots you can edit? We chose the layers because it's the cleanest approach, the easiest for the user to deal with.

Then we made the paint tools scroll with the page; scrolling text came out of that. Smooth scrolling, a full Undo capability, and two layers [for drawing and painting] require four memory buffers, which is why *SuperPaint* needs so much memory.

**What about new graphics products such as those from Adobe, Aldus, Cricket, or PS Compose?**

They're not a threat to our market leadership in paint software. Only two compete at all, *GraphicWorks* and *FullPaint,* and the new version of *MacPaint* expected from Claris will have more features but has mainly been cleaned up to be fully compatible with the Mac II.

The others, like *Illustrator* and *Cricket Draw,* are different products. We often tell people to get *Cricket Draw* for certain things. Cricket tells people to buy our program for bit-map editing. Where we stop in drawing capabilities, they start. Ours are complementary products. At trade shows these days, Apple's booths have an art and

*(continues)*

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The Radius Accelerator™ quadruples the processing speed of every Macintosh application.

If you're doing graphic design or Desktop Publishing, the Accelerator allows you to create and combine pictures and text at unprecedented speeds. We are talking blindingly fast.

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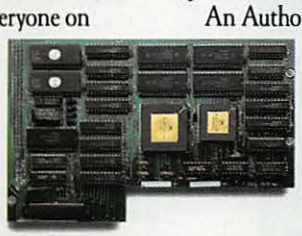

The Accelerator is powered by the same 32-bit microprocessor that commands the Macintosh II.

In addition, it has a high-speed hardware cache that places frequently used information where it can be retrieved at the full speed of the MC68020.

Although the MC68020 is a commonly used microprocessor, Radius makes it work in an uncommon fashion. Our innovative, proprietary technology translates into a smaller board with fewer power requirements. And that means significantly reduced costs.

Which is one more reason why the Accelerator is such an exceptional value.

For those of you who think numbers speak louder than words, the Accelerator is available with an optional MC68881 coprocessor that blazes through floating point computations at up to 100 times the speed of the Macintosh Plus.

An Authorized Radius Dealer can install an Accelerator board in your Macintosh Plus or SE computer in a matter of minutes.

But wait. Did we really say wait? The Accelerator has another unique feature. The MagicBus.™

The MagicBus allows you to expand your Macintosh with another internal expansion board. So you can add future products from Radius or other developers.

Of course, you could use the MagicBus immediately—to install the ultimate Desktop Publishing peripheral. The Radius Full Page Display™ (FPD).

Like the Accelerator, the Full Page Display was designed by several key members of the original Macintosh team.

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*We were concerned for a while that the Mac wouldn't make it. Then things turned around, and since then we haven't wavered.*

illustration section. They show *SuperPaint, Cricket Draw,* and *Adobe Illustrator.*

**What's holding up high-end animation products for the Mac II?**

There is no technical reason, especially not with the Mac II. It's a question of how much demand. If you go to SIGGRAPH, the big computer graphics trade show, you see that the Mac II is just within the realm of what professional animation hardware does. It will take another one or two years for the software to get here.

**What do you think about the growing controversy between PostScript and QuickDraw?**

We're watching closely. Apple knows that QuickDraw must go further, and it will take it further. We haven't done any PostScript programming, but at some point we may decide PostScript capability is needed in our software. So far Cricket and Adobe have strong PostScript capability in their products, so we want to focus on QuickDraw.

**Does PostScript ever contend with QuickDraw in the Mac market as a screen driver?**

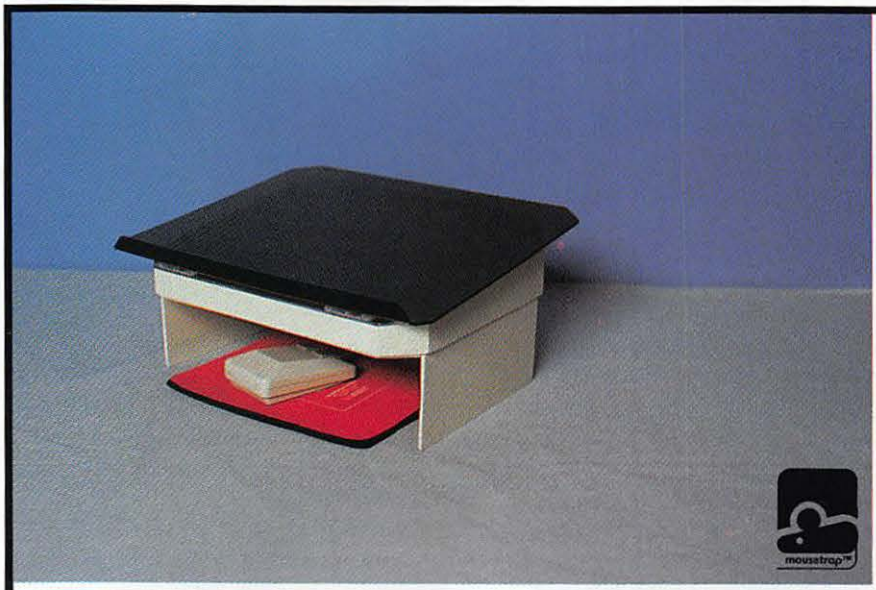
I'm told that PostScript is very slow as a screen language, so you would need some specific hardware to drive it, but yes, that will probably happen on other computers. People at Apple have told me that they will continue to support PostScript for printers because it's an industry standard, however, they'll continue to develop QuickDraw.

**What do you think about your relationship with Apple as a developer?**

It's good. John Sculley has brought stability to the market. There is a two-to-five-year plan that was not there before, and it showed. We were concerned for a while that the Mac might not make it. Then things turned around, and since then we haven't wavered. We are going to stay on the Mac–with graphics products.

Other hardware companies don't offer the kind of support to developers that Apple does. We went to an Amiga developers' conference and saw that Commodore was trying to emulate Apple, but without the resources. We abandoned the thing because their system software was so bad. Our developer brought our Amiga back to us and said, "I quit," so we dropped that.

*(continues)*

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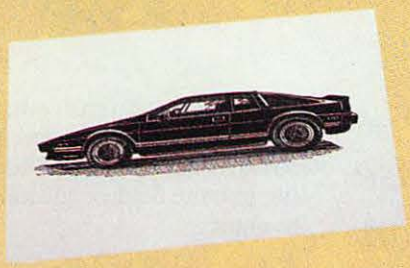

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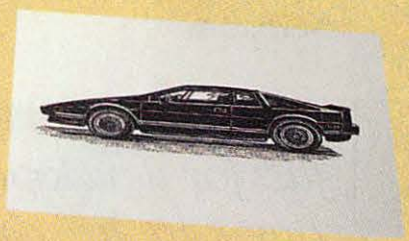

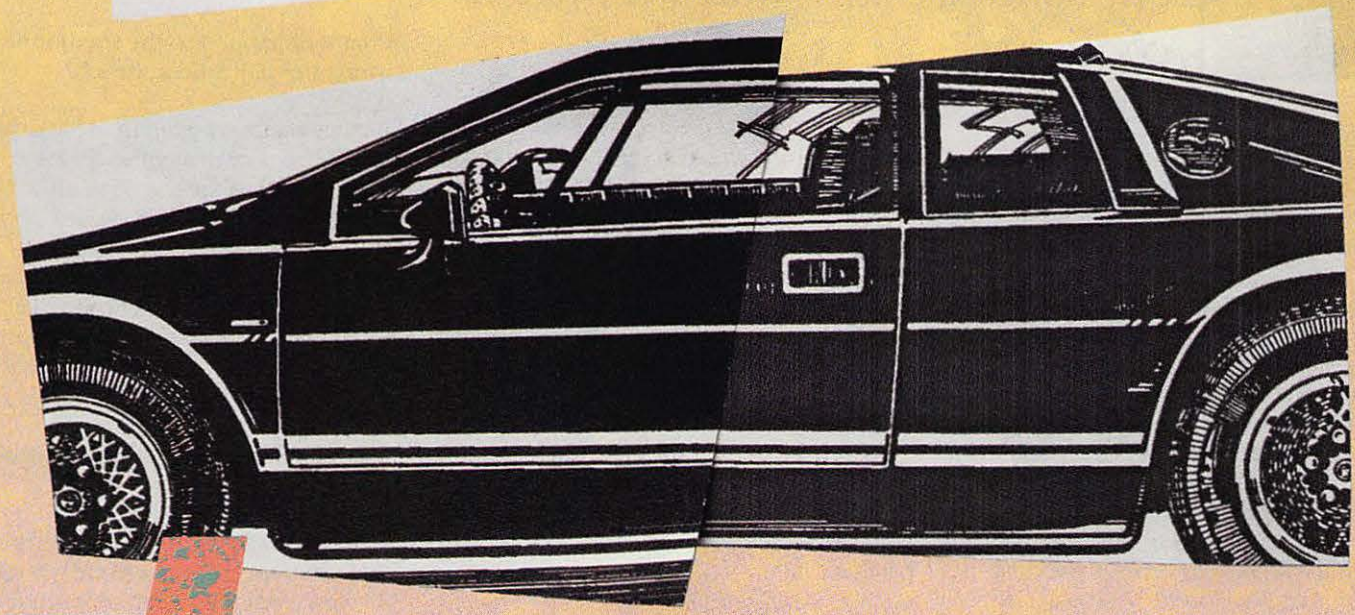

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## *System software is changing too fast for developers.... Do we revise our software each time the System changes?*

System software has been an issue at Apple, too. It's changing too fast for developers. Apple moves so fast to keep up with IBM, but it takes us time to keep up with Apple. Do we revise our software each time the System changes? If we did we'd be sending out a new version every month to our registered users. We want to keep our costs low, and people running a business don't have time to run around checking software version numbers. The business community would prefer two predictable releases each year.

So our software is bound to run into problems with new Systems. If the problems are marginal, do we send out a free update (which would cost us over $100,000 on *SuperPaint*) or do we wait?

**And what about the need for a minimum 2MB of memory with MultiFinder?**

The cost is tough, and it means that people must delay their upgrades to the newest System. It makes us think we'll wait until more people are using MultiFinder before we send out an upgrade. Then we can send out a major upgrade that we can charge for. Of course, MultiFinder had been delayed a while; that meant less pressure to send a patch for it.

**What are the trends in our industry?**

All of the mergers? That's a normal part of our business. Lots of people start a business intending to cash out, and this is a good time to be acquired. The Mac is high, so other companies are interested in coming into the field; acquisition is a fast way to enter.

**What will happen to the small innovative companies like Silicon Beach?**

First, we're not so small in the Mac business. We're now one of the bigger companies, and within the top 50 of all software companies in terms of revenues, about $5 million.

My first response to being acquired is "I don't need that." I've learned that as long as we stay product-driven, not advertising-driven like soap powders, we'll be strong in this market.

**Okay, so what about your latest product, *Super 3D?***

It's a general 3-D graphics editor, not a CAD program. Just for anyone who needs 3-D views, or to visualize something. Architectural buildings, maybe structural de-

*(continues)*


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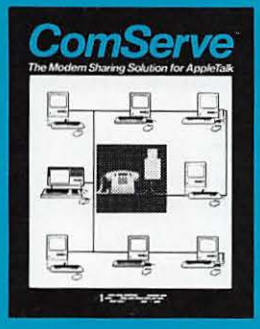


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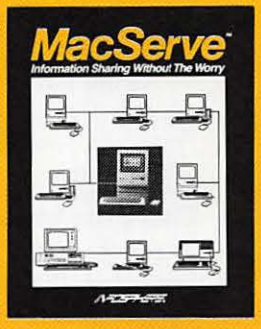


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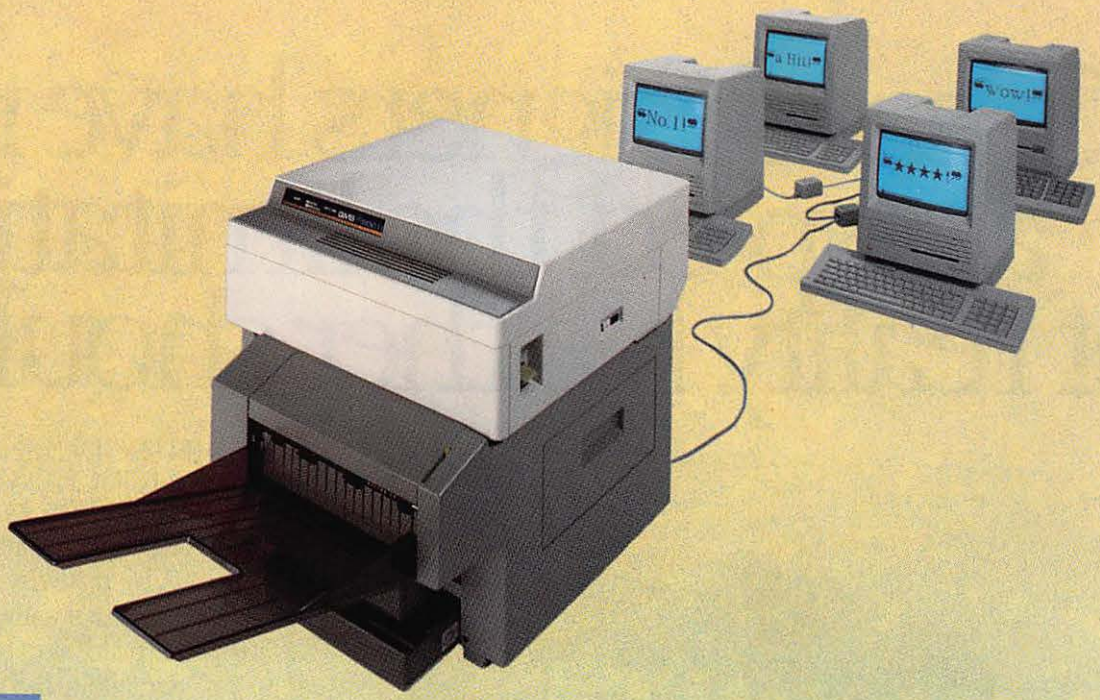


# The PostScript laser printer sure to get high ratings at its network debut.

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The QMS-PS® 800 II is an 8-page-per-minute laser printer that combines the desktop publishing power of Adobe PostScript® with the superior printer technology of QMS, a leader in printer technology for 10 years. Exceptional paper handling, faster processing speed and a Canon® CXD® print engine with 10,000-page-per-month duty cycle give QMS-PS 800 II the versatility your Macintosh™ network needs.

**A network sensation** QMS-PS 800 II holds 500 pages, so operators aren't constantly refilling depleted paper trays. Users can even designate automatic switching between the two trays for doing letterhead/second page printing. Select faceup or facedown collation. And manually feed odd-sized paper stock.

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**Type casting** The QMS-PS 800 II comes with 35 resident typefaces (you can download more if you like). PostScript allows you to scale type to virtually any size, from minuscule to mammoth. PostScript also enables you to design, and redesign, your documents with exacting detail. You have total control over the final appearance of documents, with the ability to place text and graphics anywhere on the page. In short, you get the complete desktop publishing power that only PostScript can give you.

**Critical acclaim** The QMS-PS 800 II is certain to receive rave reviews on your network. And for a single-user set-up, there's the QMS-PS 810 laser printer. For a demonstration of either, call **1-800-523-2696** for the location of the Laser Connection dealer nearest you. And be sure to ask for *The Sourcebook*™ – our exclusive catalog filled with the latest laser printer products and enhancements.

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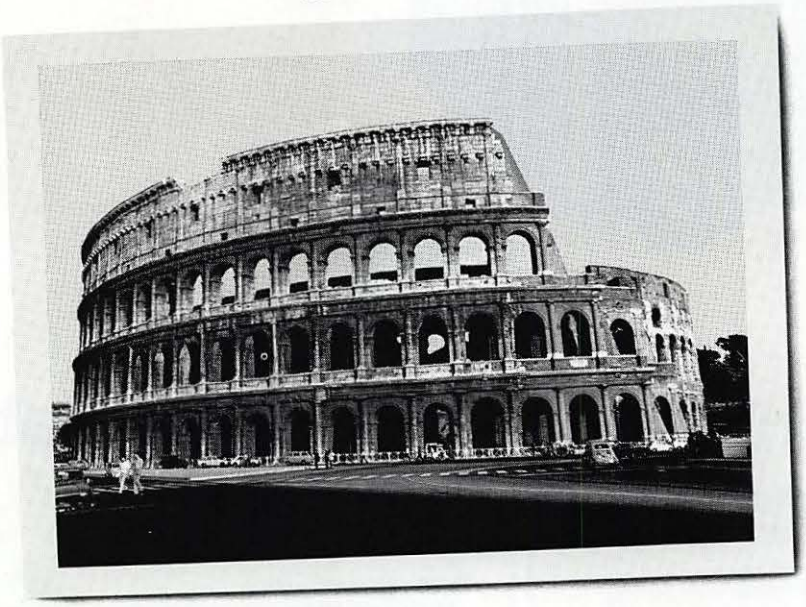
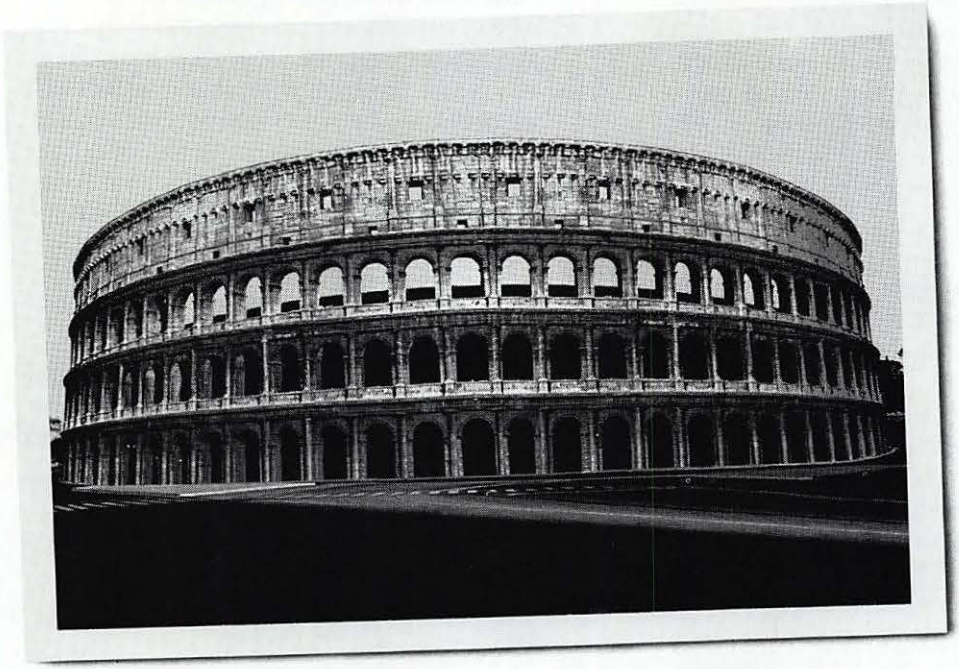
# Great designers have never accepted the limitations of reality. Neither should you.



Reality.



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# You don't stop to be fed every 12½ minutes. Neither should your Apple LaserWriter.

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There's also an increase in your LaserWriter's flexibility. You can load the front tray of your LaserWriter with letterhead, and PaperPlus 500 with second sheets. You can then instruct the printer to pull a sheet from the front tray first, then instructions to pull second sheets from PaperPlus 500.

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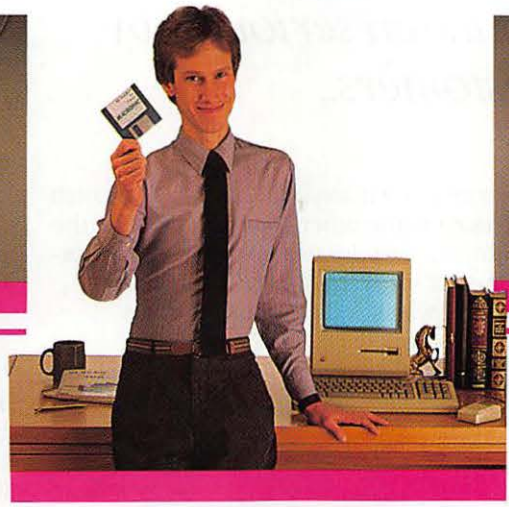

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— Plus 96 more features to save time and multiply the power and ease-of-use of Excel.

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### ELIMINATE FRUSTRATION

How many times have you had to go back to the manual to learn how to do some simple function that seems overly complicated in Excel? How often have you waded through charting, database operations and building tables? How often have you wished that you didn't have to wear out your arm reaching for the mouse to perform just about every operation? The macros in *101 MACROS FOR EXCEL* help you out with everything from simple mousestroke and keystroke savers, to sophisticated, interactive macros which "walk you through" more complicated Excel operations.

### EASY TO USE

These macros are extremely easy to use. Just load the macro sheet called 101 into Excel and you'll have all 101 macros available for instant use at any time.

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*101 MACROS FOR EXCEL* comes complete with a comprehensive, step-by-step manual that includes a short tutorial chapter and explains each of the macros and how to use them. The macros are fully documented, so they're easy to review, change and learn from — which gives you an excellent starting point for writing your own custom macros.

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*Two hundred dollars is a lot to spend for a product. But at $99, a product's not taken seriously by corporate customers.*

sign, graphic design, or for those who want to animate their designs.

It doesn't have all of the features of a full-blown animation program, but it is possible to do frame-by-frame motion and save the frame for playback. It's priced at $295 and will ship during the January Macworld Expo. A second version for the Mac II or machines with a math coprocessor costs $495.

**What kind of company will Silicon Beach be in the future?**

Our games have pushed the technology for sound and animation. We'll continue to push the technology forward in Mac programs so that the next people who do a product in our area will have to go a notch better. On the other hand, we won't be the company that dreams up the next new category of software. We listen to what the market wants and take our products from there.

**Are there other companies' products you admire?**

From the viewpoint of the consumer, there should be a good word processor out there with everything we need. We're still waiting on that. *WriteNow* is the best on the market, even though it lacks the ability to read *MacWrite* formats.

Then from a publisher's perspective, I have to admit admiring Microsoft. I don't really use *Excel* the way someone in finance would, but I know that it's a fine product. Some people react against the advances Microsoft has made in Macintosh market share, but I say they've earned it. They have strong products that people want: *Word, Works,* and *Excel.*

**How about the pricing of software?**

We've kept our prices low and built goodwill, and we've kept good value for the price. But the market has changed. The Mac is now selling principally into businesses; retailers sell more to companies with purchase orders than to individuals.

I'm a consumer. I love to go to user group meetings, love to buy other companies' products. On the one hand $200 is a lot for a product; it's tough for the end user. But at $99, a product's not taken seriously by corporate customers. In the old days there was word of mouth and the buzz about products; then if you placed an ad you got a lot of calls. Now there is a clutter of products, more competition in advertising. The cost of doing business is higher.

Since the customer has changed and the competition is really heating up, we

*(continues)*

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C.J. Weigand
MACazine Oct. 1987

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# How Jasmine turned SCSI into a Moving Experience.

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MegaDrive is a moving experience for any Macintosh user. Desktop publishers can store fonts, clip art, layouts, and different clients on separate disks. Musicians can use it to catalog sound libraries and samplings.

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| Access Time | |
| Track to Track | 25 msec. |
| Average | 65 msec. |
| Maximum Seek – Full Stroke | 125 msec. |
| Average Latency | 50 msec. |
| Mean Time Between Failure | 40,000 POH |

Visit us at MAC EXPO San Francisco

Every drive is shipped with a technical hotline number to answer any questions. MegaDrive and Jasmine, are trademarks of Jasmine Technologies, Inc. Product specifications and prices are subject to change. Prices include 2' cable and PD software. Prices do not include shipping, CA sales tax (6.5%) or special rush handling. Macintosh is a trademark licensed to Apple Computer, Inc.

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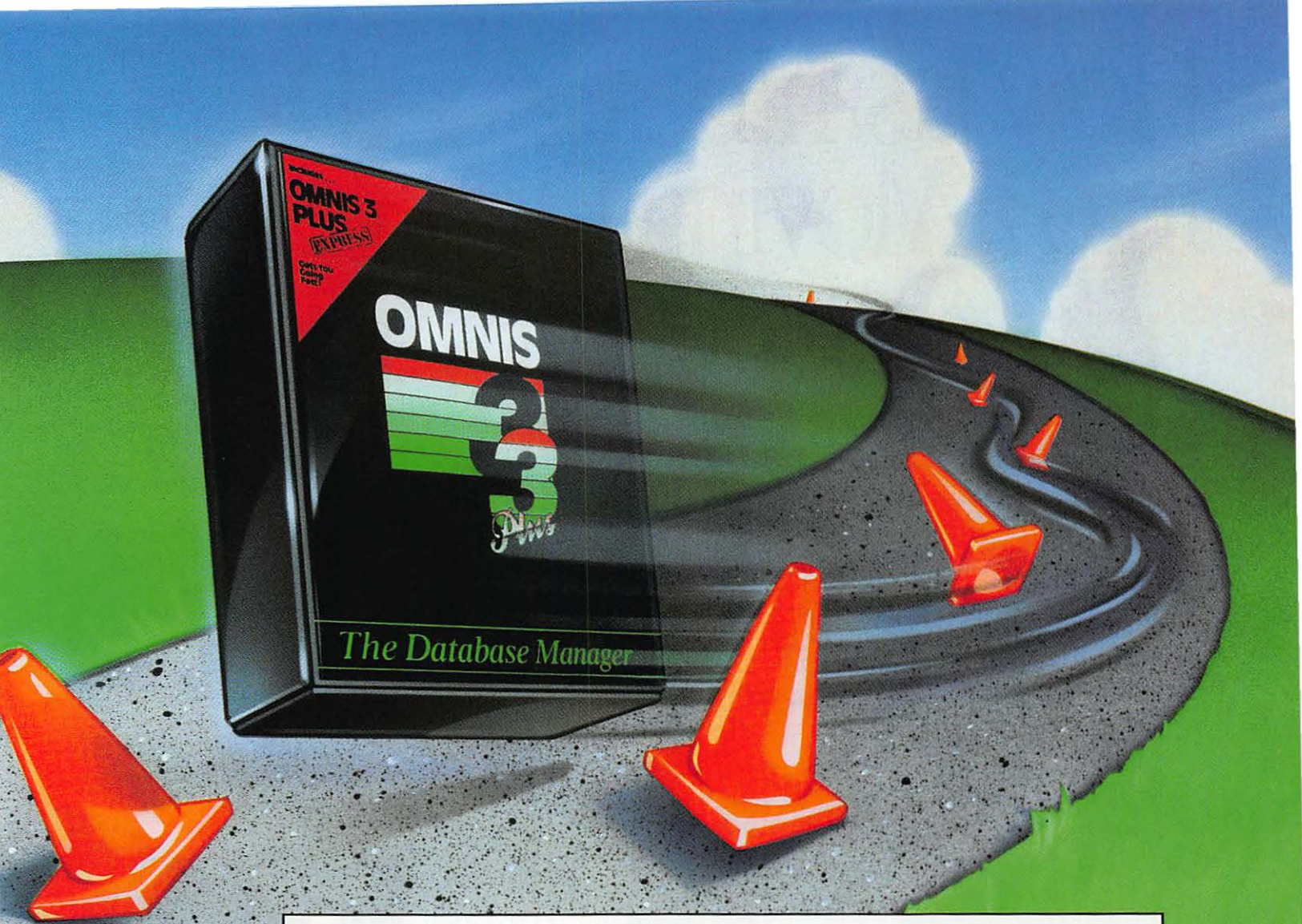


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For information on how Omnis 3 Plus/*Express* can help you, see your local Apple dealer. Or call Blyth today at 1-800-843-8615 (in Calif., call 1-800-223-8050). And ask for the location of the Omnis Development and Support Center nearest you.

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# DaynaFile. The Search For IBM PC File Compatibility Is Over.

Tired of hacking through the jungles of MS-DOS in search of data file compatibility for your Macintosh™? Or fighting a tangle of networks, cables, and add-on cards, just to edit a simple file?

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DaynaFile is an external disk drive that lets your Macintosh read from and write to a DOS-formatted data disk.

A SCSI port connects it to the entire family of Macintosh computers from the Macintosh Plus to the SE and Macintosh II, without an add-on card.

Imagine what that means. With a simple disk drive, you can now access thousands of IBM data files created by programs such as Lotus 1-2-3,™ dBase III,™ WordPerfect™ and AutoCAD™—with the ease of Macintosh. Just point and click.

And, as a single or dual-drive unit, DaynaFile can handle all the IBM personal computer file formats you have to deal with, in both 5¼" and 3½" disks.

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So call us today. And call off the search.

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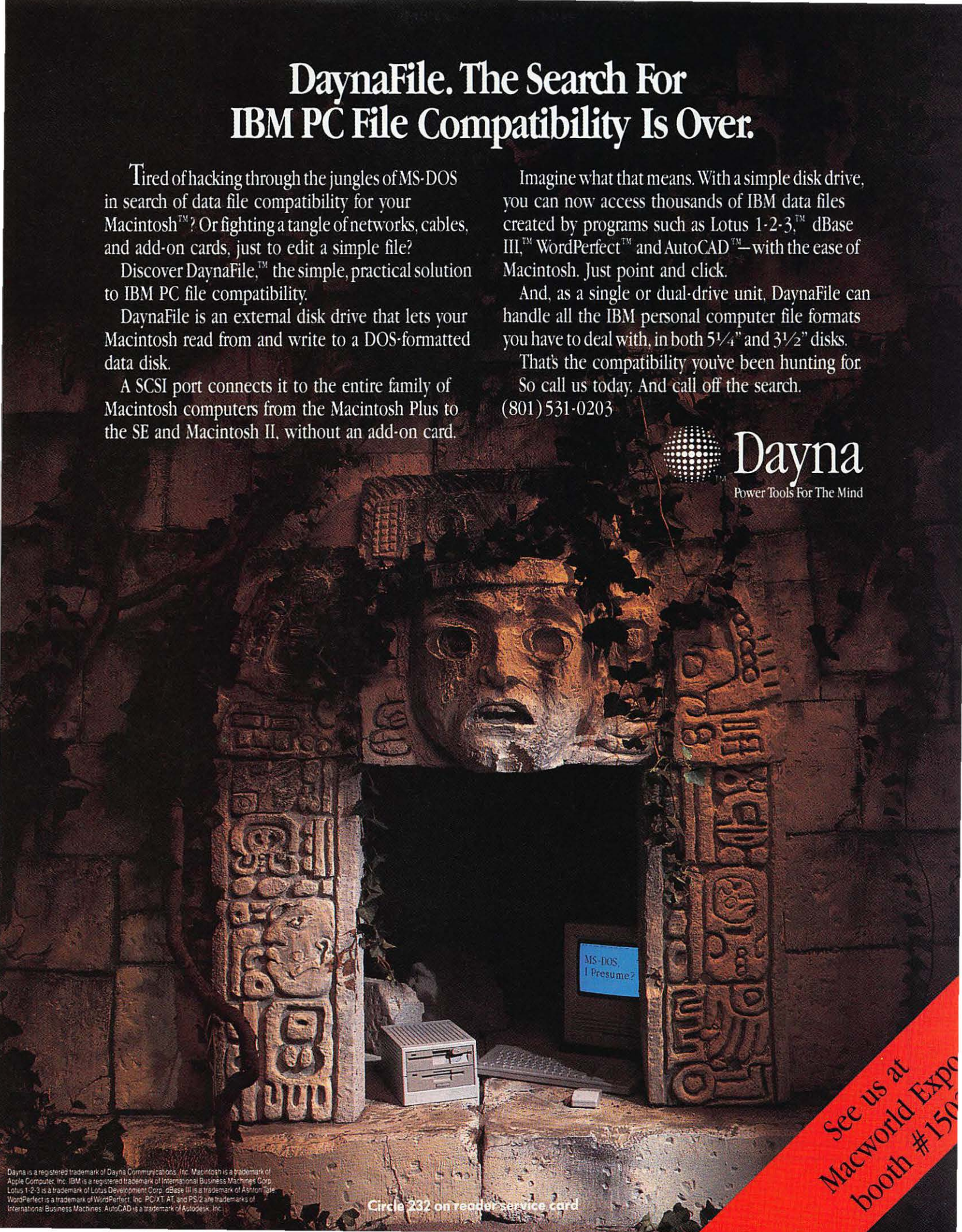


See us at Macworld Expo booth #150

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*Apple needs to take a stand on standards—on file formats and on the user interface.*

must adapt. Which means raising prices some. We must have profits to stay in business, so we're shifting from strictly consumer pricing to a middle price range.

**There are more questions about the high price of the Mac itself.**

I agree in some ways, but the Mac is now selling increasingly in markets that are not so price sensitive. To lead in its market, Apple has to spend a great deal in research and development, and it's not necessary that the company be a price leader. Compare the price with what you pay when you get a fully loaded MS-DOS or OS/2 machine.

**What will the competition between IBM and Apple look like in the near future?**

There is room for a couple of major players, and Apple will definitely be one of them. But the Mac will not become the dominant CPU in the industry. PS/2 and OS/2 will be stronger, but they won't become a standard for another year and a half, then continuing for about seven years. Some areas in that machine are better than the Mac operating system. One has to be careful to avoid the Mac fervor and religion. I have to be a realist and see that we have a challenge there.

Eventually, however, I see software on the Mac competing with workstation software at a much higher end of the market.

**Any problems that you foresee?**

Apple still must mature as a company. Apple has to evolve into a company that can sell computers to companies. It needs the people in the field to talk to and listen to the groups that it would sell to. That's IBM's strength. Apple needs a corporate image; it has to show stability and have powerful marketing.

Another problem is that the Mac is getting complicated. In the past we knew what we had on the desk; now there are complicated System software versions, incompatibilities. It may take Apple one to two years to bring the stability back into their market. Apple needs to take a stand on standards—on file formats and on the user interface. That's deteriorating now; that's one of the issues everyone's asking about. Apple used to dictate to developers about doing things in these areas, and it was one of the reasons for the company's success.

For example, *Interleaf* runs under its own operating system, not under the Mac operating system. Then there's the proliferation of peripherals. Apple has to work to resolve these things.

**Where do you want your company to be in five years?**

We want to reach $100 million in revenue, but I would like the company to be similar to Silicon Beach today. There is a strong sense of family that I wouldn't like to lose. I can see us having 40 to 50 people.

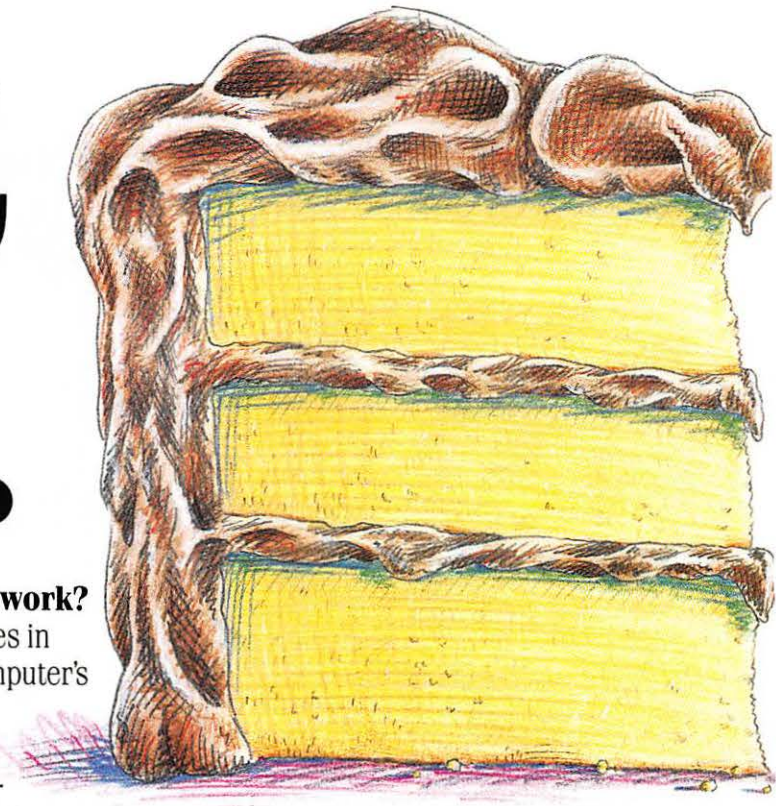
**What keeps you going through the long nights that this industry is famous for?**

Public response. I remember going to the first Macworld Expo. We had a new 512K Mac. We had a 10-by-10-foot booth. We couldn't afford to rent tables, so we brought our own tables up from San Diego. Also we had some big waist-high speakers. We had *Airborne* playing, and the sound of the jets, missiles, and helicopters was incredible. Watching the people's faces. I remember one little kid, with his face up close to the screen—a jet came whooshing out, and he jumped back. I remember industry people coming up and telling me that it was incredible that this was happening on a microcomputer. □

*Interviewed by Jerry Borrell*

# What to do if you don't know which local area network to buy.

# Just ask.



*Some people say installing TOPS is a piece of cake. But others disagree. They say it's as easy as pie.*

### Why a network?

First things first.

Chances are, you already think you might be able to use a network or you wouldn't be reading this.

But you may not know exactly what a local area network can do for you.

Typically, a local area network can help a group of people and their personal computers work together by letting them share information, files, software, and peripherals.

The result of that sharing is that the people on the network can do more, better, in less time.

The next question then becomes, which network?

### Why TOPS?

Good question. And we have a good answer.

TOPS® is the simplest, most efficient, and most economical network you can buy.

You connect different, incompatible computers, and share files between them as though they spoke the same language.

Because with TOPS, they do.

That makes using the network very straight-forward and easy.

And since TOPS is so uncomplicated, it's economical, too.

### How does it work?

TOPS resides in your microcomputer's memory, so regardless of which application you're running TOPS is always there.

And it allows you to connect Macintoshes, IBM PCs, and Sun Workstations® and share files among them.

*If you have a phone system, the cable for your TOPS Network is already installed.*

TOPS is a *distributed server* network. So computers share files directly with each other without having to go through a centralized network server where all the files are located.

That's one of the reasons the TOPS Network is so simple, efficient, and cost-effective.

### What's the difference between TOPS and other networks?

The basic difference is that, as we mentioned, TOPS is a distributed server network.

Most other networks require a *dedicated server* where all the files reside. And in order to get at your files—or anyone else's, for that matter—you have to request them.

This is an authoritarian setup where you don't have as much direct control over your information.

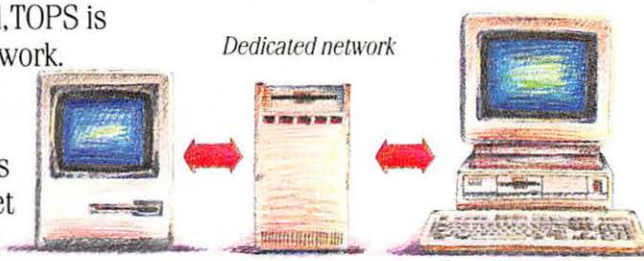
It's also more expensive. There's a central file server, special cabling, and more often than not, the services of a skilled network administrator are needed to set up and manage your centralized network.

TOPS is more democratic. Every computer on the TOPS Network is both a network station and a network server. Files move easily from one computer to another, you have complete control over your information, and contention problems are far less likely.

### Will we be able to connect different computers?

Different computers or the same

*Dedicated network*



*Dedicated networks use a central file server as a middleman. Which slows down the whole network with contention problems and costs more besides.*

*TOPS translates files so they can be used by every computer on the network, regardless of its operating system. So all your computers can speak the same language.*

computers. TOPS is designed to connect Macintoshes, Sun Workstations, IBM PCs and compatibles in any combination thereof.

So no matter what the operating system—DOS, UNIX, or Macintosh—TOPS lets you share files and applications between all of your computers.

With TOPS, there are no compatibility problems. Because TOPS translates between file systems, you can access files stored on any other computer on the network just as if they were stored locally.

And that means you can choose the computers and peripherals that are best for you. Because they're all partners on TOPS.

### How do we share files?

In a word, transparently. Macintosh folders and MS-DOS directories are known to TOPS as volumes.

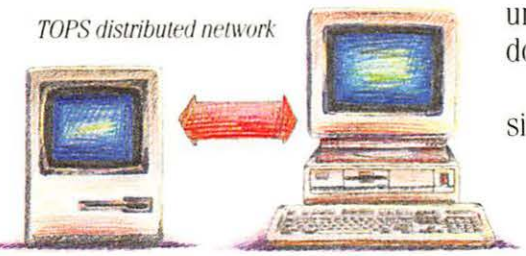
To make your volumes available to others on the network, you "publish" them.

Any volumes you don't want shared, you simply don't publish. You can also make individual volumes available on a read-only, read-write, one-writer-only, or many-writer basis. And you can assign passwords to certain volumes to further restrict access.

When you want access to others' volumes, you select and "mount" their published volumes. You can then print, copy, or edit the remote files as if they were your own. Because on a TOPS Network, for all intents and purposes, they might as well be your own. Different volumes from different computers don't look and feel different at all.

And that's what makes TOPS so simple. And so beautiful.

*TOPS distributed network*



*On the TOPS distributed network, every station is a server. So it's far more efficient and far less expensive.*

### Can we all share the same printer?

Absolutely.

The same printer, the same disk drives, the same files.

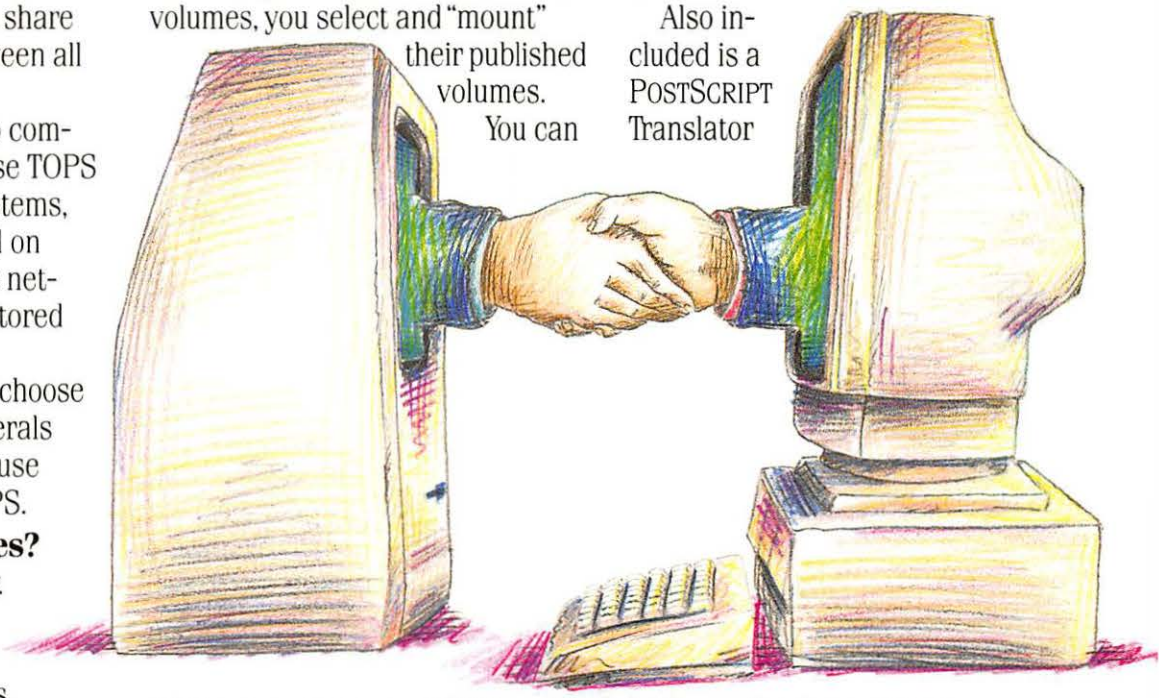
The TOPS Network is totally democratic. So everybody gets to share everything.

For example, if you don't have a network printer, TOPS/DOS will also allow your PCs to share a locally attached printer with all other PCs on the network.

Great, you say, but what happens when someone with an IBM PC wants to use a LaserWriter or networked POSTSCRIPT printer?

No problem. TOPS NetPrint™ software redirects POSTSCRIPT output to a networked laser printer.

Also included is a POSTSCRIPT Translator for those applications that don't presently support POSTSCRIPT.



*TOPS connects Macintoshes, IBM PCs and Sun Workstations, and lets them work together like nothing else.*

But no matter which computer you're on, you won't have to wait around for the printer to finish printing before you can use your computer again, because TOPS also has a print spooling feature.

The spooler takes the file you want to print and frees your computer so you can go back to work.

And that even goes for large files from applications like PageMaker and Excel.

### What kind of cabling will I need?

More good news.

TOPS runs over low-cost, twisted-pair cabling like the TOPS TeleConnect System, AppleTalk, PhoneNet or ordinary phone lines.

So if you're in an office where everyone on the network already shares the same phone system, you'll be happy to know your TOPS cabling is already installed.

In that case, hooking up your computers to the TOPS Network takes all of about 5 minutes.

Provided of course, you don't rush it.

### Who's going to install it?

Glad you asked.

Your TOPS dealer can install TOPS for you.

Or you can install it for yourself.

Really, plugging in a new set of stereo speakers is more difficult.

Using the phone lines, you merely plug in a network connector such as TOPS TeleConnector™ (your dealer will see you get the ones you need). One end goes into the back of the computer and the other into the phone's wall outlet.

Worst case, you have to run your twisted pair cables from office to office. That takes time, but once that's done, getting your computers on the network is a snap. Literally.

### How big can we make our network?

You can make it as big as you want. Because you can connect up to 65,000 network buses using network bridges such as the Hayes Interbridge.

The typical network group size for an individual TOPS Network is between 2 and 12 users.

And to add additional users to the network, you simply add additional copies of TOPS.

But you can also expand your 2 to 12 person network by using the TOPS Repeater™ to connect it with other TOPS Networks.

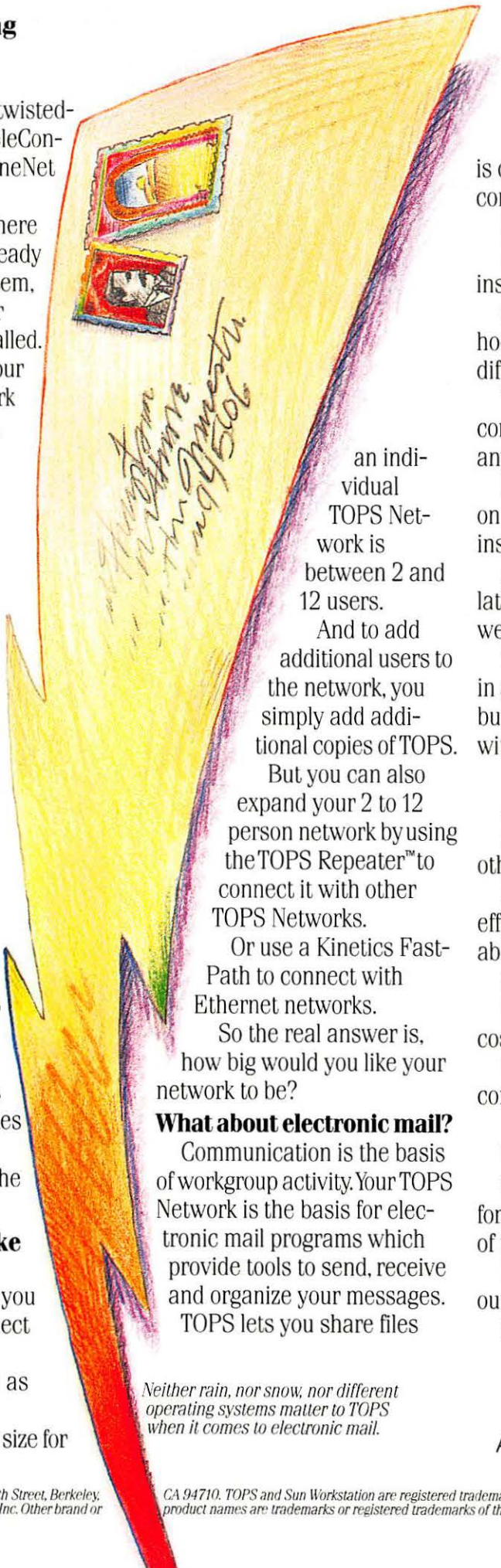
Or use a Kinetics FastPath to connect with Ethernet networks.

So the real answer is, how big would you like your network to be?

### What about electronic mail?

Communication is the basis of workgroup activity. Your TOPS Network is the basis for electronic mail programs which provide tools to send, receive and organize your messages.

TOPS lets you share files and peripherals, electronic mail lets you share ideas.



*Neither rain, nor snow, nor different operating systems matter to TOPS when it comes to electronic mail.*

### Will I need training?

Most TOPS users don't.

And that's not because TOPS is only bought by experienced computer jocks.

Quite the opposite.

It's just that TOPS is that simple to install and run.

Once you've got your computers hooked together, installing TOPS isn't difficult at all.

You load the TOPS disks into your computer the same way you would any other software.

Dialog boxes and menus will come on the screen and walk you through installation.

And when you're done with installation, you'll find that you're very well connected.

There's also a manual that explains in greater detail how TOPS works, but you could use TOPS for years without ever opening the manual.

### What's it going to cost?

A lot less than you think.

And certainly a lot less than other networks.

In fact, TOPS is the most cost-effective local area network available, with the lowest cost per station.

Starting at $189.

By comparison, other networks cost up to three times as much.

Which really isn't much of a comparison.

### Where can I buy TOPS?

We thought you'd never ask.

Call us at 800-222-TOPS (in California, 800-445-TOPS), for the name of the TOPS dealer nearest you.

Because if you need a network, our network is on TOPS.

No question about it.

TOPS®

A Sun Microsystems Company

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# Expandability, flexibility, productivity, and the ability to soar.

Make your Macintosh SE soar up to four times faster with Dove's new MacSnap™ 020 SE accelerator power board. The MacSnap 020 SE accelerator is the only design available that fully utilizes the SE's internal memory, allows for expansion to 5 megs of memory and offers a 68881 co-processor option. The MacSnap 020 SE uses state of the art LCA (logic cell array) technology. This programmable LCA technology offers you a growth path for the future because the MacSnap 020 SE hardware can be reconfigured to accommodate advanced design features. All by inserting a Dove software disk into your Macintosh!

The MacSnap 020 SE has less than half the parts of other accelerators so it generates less heat, consumes less power and offers higher reliability. The kind of reliability you've come to expect from all Dove products. For improved productivity and dependable quality, spread your wings and soar with the MacSnap 020 SE from Dove Computer.

Available now from your favorite dealer. And coming soon: MacSnap 020 for your 512K or Plus Macintosh! Call us toll free 1-800-622-7627 for more information.

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**Circle 498 on reader service card**


128K Macs, the concept of a power user was as alien as the notion of a hard disk. Now, with the advent of the Mac II, users can choose from a variety of hardware and software that gives new meaning to the term *power.*

Power users typically want the fastest, most efficient way to perform their work, whether it be a quick and easy way to return to the Finder or a means

megabytes of RAM. After all, you'll need all the RAM you can get to run 10 applications at once using MultiFinder.

Once this system is up and running, you'll find MultiFinder really shines with two monitors: a monochrome unit for full-time, instant access to phone numbers and addresses using a shareware program that converts your *SideKick* phone-

million colors.

You'll also need a large-capacity hard disk to store all those *HyperCard* stacks you've been collecting. Jasmine, SuperMac, NuData, and CMS are among the many manufacturers offering internal and external hard disks that give the Mac II more than 80MB of storage.

Even though the Finder is always available in MultiFinder, who wants to dig through 186

## New Milestone

Claris, Apple's software spin-off, has announced its first product. *MacProject II* is a major revision of the original best-selling project-management program for the Macintosh.

The original *MacProject*'s features were limited to the

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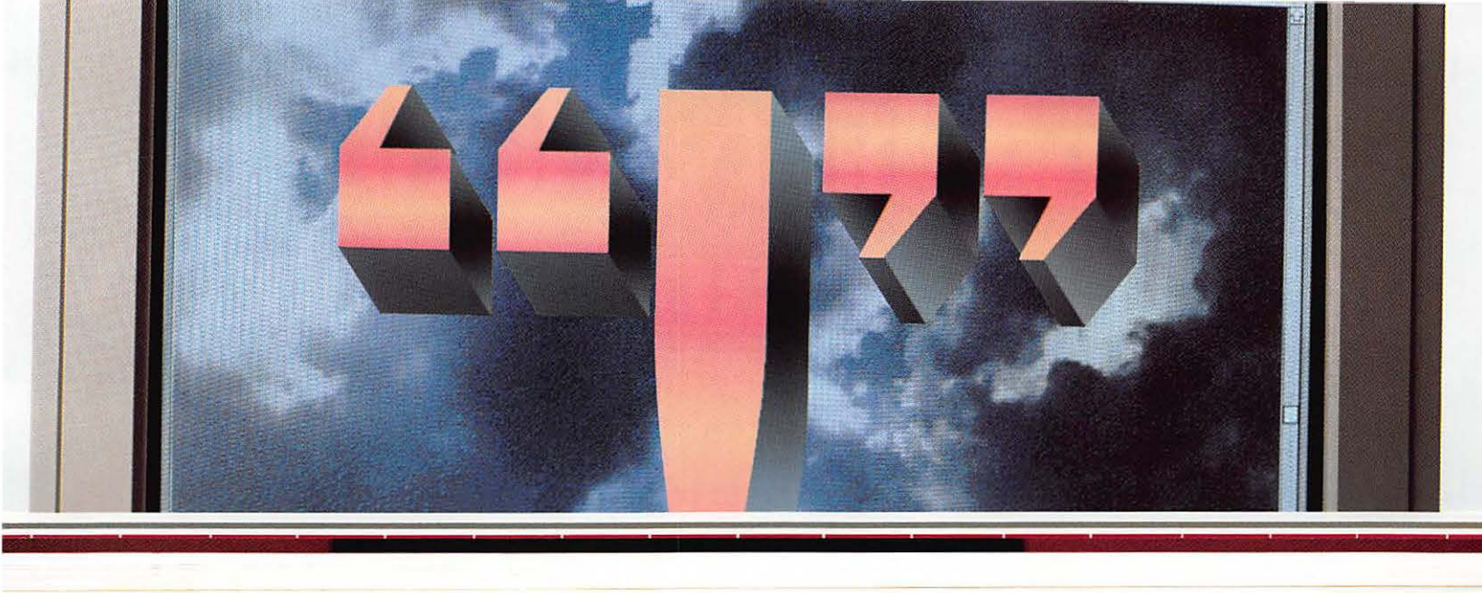
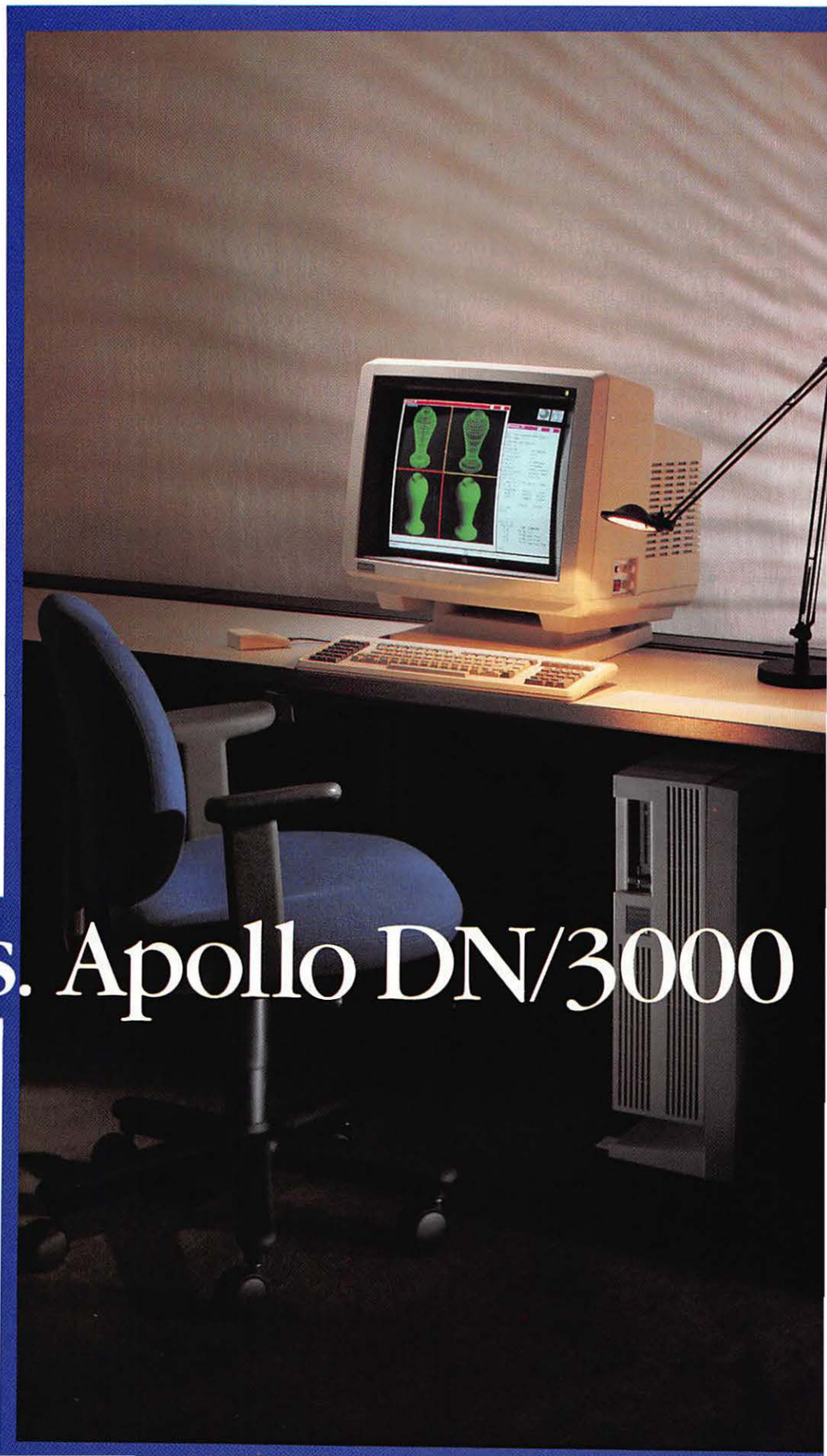


*by Harold Borkin*

# Mac II vs. Apollo DN/3000



The lowest-cost Apollo workstation, the Domain DN/3000, provides the fairest basis for comparison with the Macintosh II in terms of price. Apollo's top-of-the-line workstation, the DN/590 Turbo, offers exceptional three-dimensional color graphics performance but sells for $40,000 to $60,000. The DN/3000 costs $9000 to $18,000.

The DN/3000 desktop workstation is larger than the Mac II; in fact, it's more like the size of an IBM PC AT. Whereas the Mac II is based on a 16-MHz Motorola 68020 and a 68881 floating-point processor, the DN/3000 uses the slower 12-MHz parts.

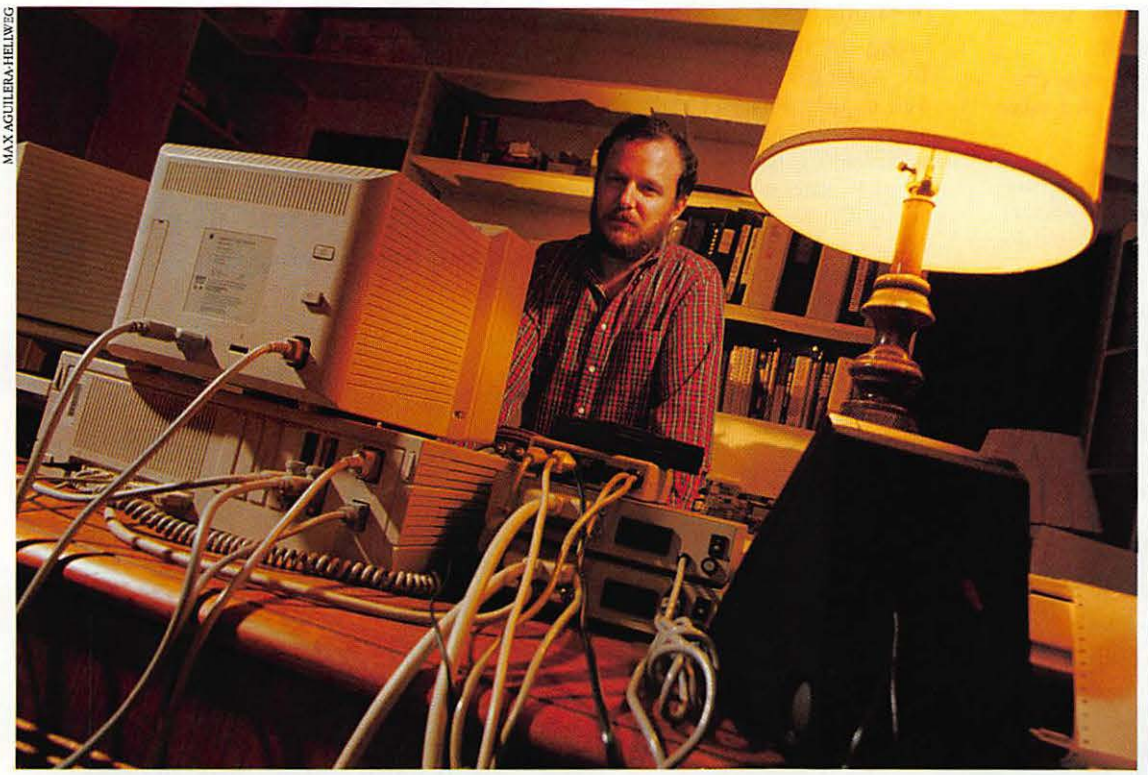
**Memories Apart**

The DN/3000's memory can be expanded to 2-, 4-, 6-, or 8MB, whereas the Mac II lets you expand to 2-, 4-, or 8MB on the main board and more using the NuBus. Unlike the Mac II, the standard DN/3000 comes with a hardware memory-management scheme that provides a virtual memory capability and allows multiple programs to run simultaneously. The DN/3000 runs up to 56 concurrent programs, or processes.

The DN/3000's virtual memory allows each process to address up to 64MB, even though the most RAM you can install in the DM/3000 is 8MB. Traditionally, with virtual memory the sections of code or data that aren't being used are kept on disk and

# Macworld News

*by Gil Davis*



MAX AGUILERA-HELLWEG

***As a power user, Rob Hahn constantly seeks the highest productivity from his Mac II, its two monitors, and a vast collection of increasingly sophisticated software.***

## Power to the People

Back in the days of 128K Macs, the concept of a power user was as alien as the notion of a hard disk. Now, with the advent of the Mac II, users can choose from a variety of hardware and software that gives new meaning to the term *power.*

Power users typically want the fastest, most efficient way to perform their work, whether it be a quick and easy way to return to the Finder or a means to access more than 15 DAs. If you're interested in becoming a power user, here's how to get started.

First, fill a Mac II with 8 megabytes of RAM. After all, you'll need all the RAM you can get to run 10 applications at once using MultiFinder.

Once this system is up and running, you'll find MultiFinder really shines with two monitors: a monochrome unit for full-time, instant access to phone numbers and addresses using a shareware program that converts your *SideKick* phonebook to a *HyperCard* stack; and a 19-inch, high-resolution color model driven by a Raster Ops video card that simultaneously displays up to 16.7 million colors.

You'll also need a large-capacity hard disk to store all those *HyperCard* stacks you've been collecting. Jasmine, SuperMac, NuData, and CMS are among the many manufacturers offering internal and external hard disks that give the Mac II more than 80MB of storage.

Even though the Finder is always available in MultiFinder, who wants to dig through 186 folders to open an application? Use Software Supply's *PowerStation* as an alternate Finder, and you can load your favorite applications or documents into buttons where just a click will do the trick. And though it is easier to get to the Finder when running MultiFinder, you'll perform your file-management more efficiently using *DiskTools II,* a great DA from Batteries Included. Need more than 15 DAs? *SuitCase* lets you install as many as you want, without ever touching your System file.

Of course, you'll need a way to use the function keys on the Mac II's extended keyboard. With *QuicKeys* from CE Software, you can launch files, call up DAs or F-keys, create macros, and switch instantly between opened applications, all from the keyboard. Press Enter, for instance, and the Finder magically appears. Who would have even thought such power possible a year ago?—*Rob Hahn*

## MacProject's New Milestone

Claris, Apple's software spin-off, has announced its first product. *MacProject II* is a major revision of the original best-selling project-management program for the Macintosh.

The original *MacProject*'s features were limited to the

*(continues)*

Original VideoWorks Owners, Trade-up to VideoWorks II for $100. See below for details.

# Desktop *Animated* Presentations

***Present your charts, graphics and reports with animation and music.***

Now you can produce full-color presentations that move. And that move your audience.

Animation adds power and persuasiveness to any presentation, whether it's next year's business plan or today's lesson plan.

New VideoWorks II makes it easier than ever to animate your shows...and your viewers. For beginners, an Overview window simplifies the work of creating presentations; that can include animation, wipes, fades, dissolves...24 different transitions in all.

Plus comprehensive timing options, sound effects, music...and the excitement of color. VideoWorks II works great with the Macintosh II (in either 16 or 256 colors) or the 512, Plus, or SE.

***Create animated presentations without being an artist.***

The VideoWorks II package comes with its own library of ready to use pre-created artwork, movies and "clip animation"(e.g. flags waving, a cannon firing). In addition you can take images from PICT, MacPaint, Glue or other sources and animate anything from a business presentation to a rock video. (You can also use VideoWorks II for your *nonanimated* slide shows.)

The original VideoWorks made history. (*MacUser* called it *"the most innovative program of the year."* Disney Animator Frank Thomas said it was, *"the best program I ever used."*)

Now, VideoWorks II is so improved it's virtually a whole new program. It gives you more than just graphics, it makes your presentations come alive!

See it at your local software dealer.

Suggested retail price:$195.

*Ideal for:*

- **Business Presentations**
- **Animated Slide shows**
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To trade up send $100, your original Movies disk and $7.50 for shipping.

Comes with three 3.5" disks (800k each): the Program, Clip Animation, Artwork and Movies; and a Guided Tour training disk. Not Copy Protected. *Clip Animations™, Clip Charts™, Clip Sounds™, Movies,* the *VideoWorks II™* ***Hypercard Driver*** and *VideoWorks II™ Compiler* disks are also available.

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**Circle 781 on reader service card**

planning and presentation phases of project management. For demanding applications, the program was simply not competitive with MicroPlanning Software's *MicroPlanner Plus,* the only other such program available.

ED KASHI

***Engineers at Ford Aerospace in Palo Alto, California, manage construction of India's new weather satellite using* MacProject.**

*MacProject II* offers major new and advanced tracking capabilities. For instance, managers can now compare actual against planned performance in both the task time line (often called a Gantt chart) and the resource time line. When a task is updated, the resource time line reflects the impact of updates on actual resources, and vice versa. Both planned and actual start and finish dates can now be entered in the task information window, as well as what percentage of the project has been completed. You can also enter planned and actual amounts for costs and income. After entering information, the program automatically calculates a schedule from the task information.

*MacProject II* can also be driven solely from a resource management perspective, since entering changes and editing information in most tables and windows updates information in all other pertinent windows. Managers can now allocate both fractional and multiple resources. This feature lets you indicate, for example, that one employee might actually spend part of the day working on one task and another part on a second task. A modified resource table lets you define a number of available resources in any given area.

Managers can create up to eight calendars for assigning work schedules to a variety of individual resources: people, equipment, costs. Overcommitted resources are often inadequate to complete a task in a given time period. You can create histograms that help you detect resource underuse or overuse, and then manually adjust resources in a variety of tables.

*MacProject II* now handles bigger and more elaborate projects; only memory limits the number of resources and tasks per project. The recommended maximum on a Mac Plus is about 1000 items, up from the original *MacProject*'s 200. Each task box holds up to 16 attributes, in comparison with the original's 4 task boxes. The project table has been updated, with approximately 57 project fields available.

You can break down a single complex task in the master project into a separate collection of more specific tasks called *subprojects.* Project managers can link as many subprojects to a master project as there are tasks in the master project. This feature allows department managers or subcontractors to maintain their own project files, which can then be used to update the master project periodically and create a master report. In general, you should probably break a task into subprojects when the master project has so many task boxes that it becomes difficult to read or print. *MacProject II* will have a suggested retail price of $495.–*Adrian Mello*

# Adobe Illustrator Gets Process Color

In addition to more drawing tools, Adobe has brought color to *Illustrator*–which it now calls *Illustrator 88,* a designation that may spur other developers to identify updates by model year instead of version number.

*Illustrator 88* can print to any PostScript-compatible printer, including slidemakers and Linotronic 300 typesetters. When printing to a Linotronic, you can specify process colors that correspond to the colors of the printed product–not the screen colors. This capability represents a major step forward in Macintosh color technology.

*Illustrator* 1.0 came to the market less than a year ago as a resolution-independent graphics tool suitable for producing publication-quality art. Users would typically trace imported drawings or photographs using a tool that draws and manipulates bezier curves. However, *Illustrator* had its limitations: restricted formatting within blocks of text, no resolution-independent patterns, and spot-color output only through manually edited color layers.

*Illustrator 88* corrects many of these deficiencies by importing color and monochrome files thru encapsulated PostScript, PICT, and *MacPaint* file formats. This means users can draw using a program like *MacDraw* and then bring the file into *Illustrator 88* for further processing, including the addition of color. Many Macintosh art libraries contain *MacDraw* images, and directly importing those files means you don't have to redraw them.

Although *Illustrator 88* still

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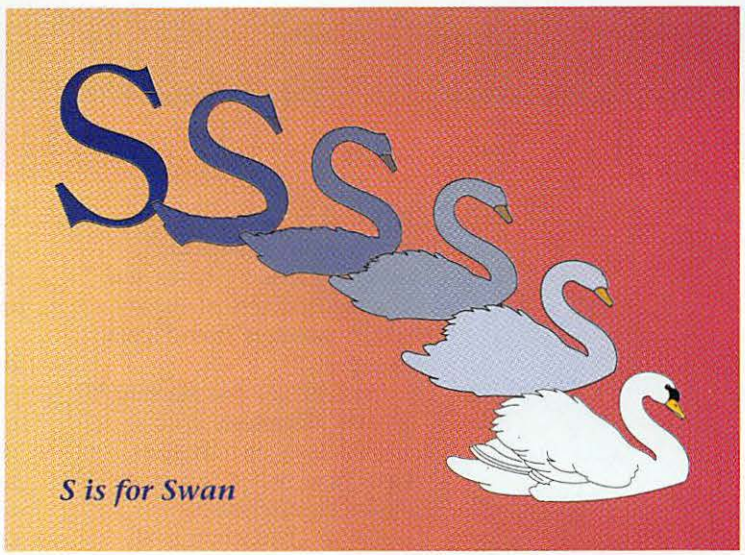


***One of the new tools in Adobe's* Illustrator 88 *enables you to transform images from one shape to another.***

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When they say a picture is worth a thousand words, they're describing LaserView,™ ultrahigh-resolution large-screen monitors from Sigma Designs.

Available for the Macintosh™ SE and Macintosh II in 15-inch and 19-inch sizes, LaserView provides a 1664 x 1200 on-screen pixel display (equal to 11 Macintosh SE screens). And because LaserView is a noninterlaced monitor, text and graphics are displayed virtually flicker-free. Even facing pages.

You can opt to view finished documents in the high-resolution 1664-1200 pixel mode. Or compose your pages in the standard, 832 x 600 resolution mode without repeated scrolling, resizing, or zooming. You can choose from three cursor sizes and two system font sizes for legibility.

For more information on LaserView, call Sigma Designs today at (415) 770-0100. Or visit an authorized Sigma Designs dealer.

Because for computer-aided engineering, advanced desktop publishing and anything in between, LaserView offers you a totally new point of view.

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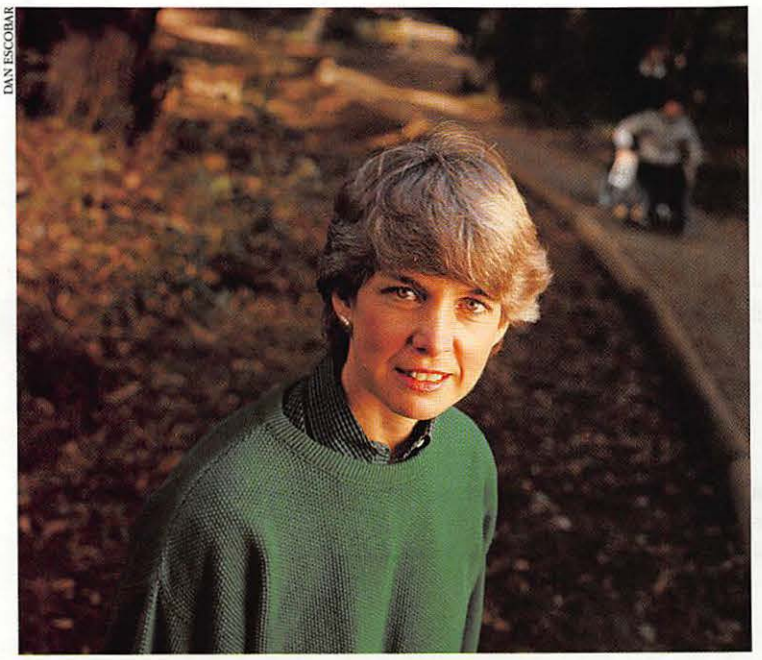
lacks many drawing tools, its new features do include an airbrush with editable patterns, a device-independent pattern maker, the ability to fill irregular outlines with complicated patterns (called clipping), and a measuring tool.

*Illustrator 88* is expected to ship in March, at the same list price as *Illustrator,* $495. For further information, call Adobe in Mountain View, California, at 415/961-4400.

DAN ESCOBAR



***Nonprofit organizations can benefit from* MacTrac, *which was beta-tested by Cindy Miller of Peninsula Open Space Trust.***

## Nonprofit Fund-Raising

Nonprofit organizations seem to love the Macintosh—it's easy for volunteers to use, it produces great-looking newsletters, and it's fun. But up to now, nonprofits haven't had a program that helps them do what they need to do most: raise funds.

Enter *MacTrac,* by the Technology Resource Assistance Center (TRAC), a program designed to meet the requirements of nonprofit fund-raisers who increasingly rely on individual donors in the face of decreased government and corporate support.

*MacTrac* supports both face-to-face and direct-mail solicitations by maintaining mailing lists, assisting with personalized letters, and tracking pledges and gifts over long periods of time. Reports can be produced and analyzed to increase income from individual donors and to improve overall strategies.

*MacTrac* especially helps with the common nemesis of nonprofit organizations: insufficient record-keeping. By properly using *MacTrac*'s readily available reports, donors can be solicited and pledge reminders for the correct amounts can be sent on schedule.

*MacTrac* was designed and tested with the help of professional fund-raisers at Peninsula Open Space Trust of Menlo Park and the San Francisco Architectural Heritage Foundation, both in California.

*MacTrac* sells for $750. For more information, call TRAC in Menlo Park at 415/321-0662.

## The Word on Word

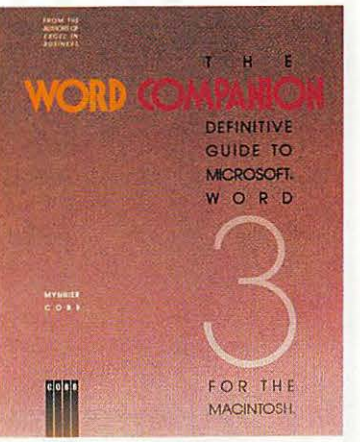
If you use *Microsoft Word* and still feel as though much of the program's power eludes you, you are not alone. While *Word* is one of the most powerful and widely used of Macintosh word processors, it is also one of the most complex. And its manuals make it difficult to get from beginner to intermediate to expert. If *Word* is the program you love to hate, then you should look into *The Word Companion* by Judy Mynhier and Gena B. Cobb, a well-written, 692-page guide to versions 3.0 and 3.01, published by The Cobb Group in Louisville, Kentucky.

*The Word Companion*'s opening chapters will get *Word* newcomers up to speed quickly and painlessly. The book is organized by functions (rather than by commands), with the first part explaining how to create, format, edit and print a simple document.

But *The Word Companion*'s early chapters are not just for novices; *Word* aficionados will also find them useful. These chapters provide advice and information on keyboard shortcuts; window-tiling techniques for viewing several documents at once; special methods for dealing with *Word*'s many complex dialog boxes; uses for extended text, superscript, and subscript; and the fine points of spell-checking and hyphenation.

To its credit, *The Word Companion* frequently points out *Word*'s faults as well as its good points. It also contains suggestions that go beyond the simple how-tos of many computer books. It explains more clearly some features that *Word*'s manuals gloss over (the Page Preview window, for example), and it covers many details that are missing from the manuals altogether. Whether you're a novice or an advanced *Word* user, *The Word Companion,* priced at $19.95, works well as both a reference (it has a 20-page index) and a tutorial, and it succeeds admirably in converting bewilderment and frustration into proficiency and power.
*–Robert C. Eckhardt*

FRED STIMSON




**The Word Companion *expands on* Microsoft Word's *manual.***

## A First: Ethernet on Existing Wiring

Ethernet is the fastest commonly used network for everything from microcomputers to mainframes. Its 10-MHz-per-second transfer rate is nearly 40 times faster than AppleTalk's 237K-per-second capability. But Ethernet's coaxial wiring is bulky, difficult to install, and expensive; and this greatly limits the number of users willing to install this fast network. To bring Ethernet to many more people, engineers have worked long to get Ethernet to run on the inexpensive twisted-pair wiring that already exists in many businesses. Twisted-pair networking is especially attractive because each telephone cable normally contains at least two twisted pairs—one pair is

# Get Organized with QuickDEX™

## A Hot Desk Accessory for Storing and Retrieving Information Instantly!

QuickDEX, the free-form database Desk Accessory, continues to draw great reviews. QuickDEX works similarly to Hypercard's rolodex but QuickDEX can be used within almost any Macintosh application without expensive memory upgrades. Names, addresses, notes, simple databases are available within seconds. *It's fast, easy, versatile, and convenient. But, don't take our word for it...*

*"QuickDEX is the quickest and easiest solution we have found for storing and retrieving simple information..."*
*— MacWEEK*

*"I use it to store addresses and phone numbers...The speed is truly amazing. One of my data files has hundreds of names (more than 43,000 characters), but it can find any record in less than one-tenth of a second."*
*— Los Angeles Times*

*"The search routine is blinding fast and so easy to use. Great little program."*
*John Lewis — Editor MacTimes UK*

*"I renamed the QuickDEX DA with a leading space so it would be at the top of my DA menu. I use it all the time."*
*Steve Brecher — Publisher of Suitcase and Powerstation*

*"We are able to find a customer out of over 8,000 entries instantly...It uses less of my machine's resources than Hypercard."*
*Al Whipple — President ALSoft*
*Publisher of Disk Express*

*"It's quick, convenient, and reliable. It has substantially displaced a couple of similar desk accessories under my Apple menu. The more I use it the more uses I find for it."*
*Lofty Becker — Author of Datekey*

*"I really am quite impressed with it...I use it everyday!"*
*Fred McClaine — Manager of programming and software services San Diego Supercomputer Center*

*"It's a superb utility!"*
*C.J. Weigand — MACazine*

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**Circle 757 on reader service card**

used by the telephone, while the other typically sits waiting for an uninstalled bell or buzzer.

Such an unused pair of wires can now carry Ethernet, using a new device from 3Com Corporation. PairTamer, a small box about half the size of Apple's external drive, takes the place of an existing modular phone

**3Com's *PairTamers: fast networking via telephone wiring.***

outlet. Up to 25 computers may be connected to a single PairTamer module.

Although the concept was simple, the aptly named PairTamer was difficult to implement because a twisted pair of wires, which can easily handle audio signals, acts as a near short circuit at radio frequencies like Ethernet's 10 MHz. There's also noise interference from the voltages running down the other pair, plus static and hum from other sources found in offices and industrial settings.

3Com solved this problem by using one PairTamer to divide up the Ethernet signal into a series of audio frequencies. Another PairTamer, at the other end of the twisted pair, recombines the signal into its original form. PairTamer can dramatically improve AppleTalk-like networks: instead of forcing users to wait seconds–maybe even minutes–for information to appear, even large files seem to leap to the screen. It's like giving each user a hard disk.

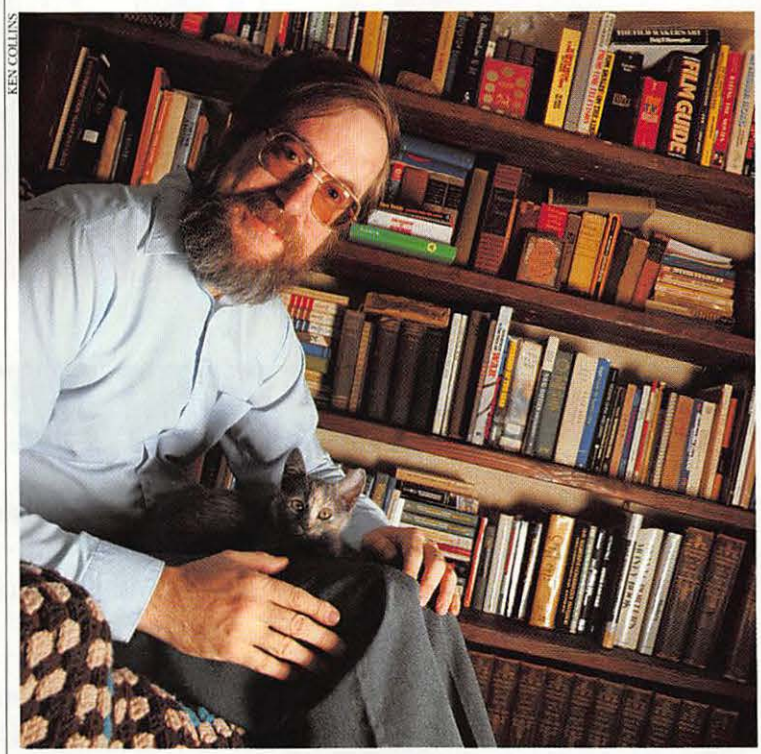
A set of PairTamers costs $325, and additional Ethernet equipment is needed. For more information, contact 3Com in Santa Clara, California, at 408/562-6400.

# FidoNet on the Mac

When Tom Jennings developed FidoNet, the first dispersed microcomputer electronic mail network, he had no idea how quickly the idea would catch on. Today there are over 3000 FidoNet bulletin board systems (BBSs) worldwide that call each other every night to exchange messages and files.

Using FidoNet, the Macintosh user can send mail overseas, upload public domain software, or download Apple technical documentation. In the near future, FidoNet will allow E-mail to be sent to commercial online services, such as MCI Mail, AT&T Mail, or The Source, as well as to noncommercial networks such as ARPANet, Bitnet, and Usenet. Best of all, FidoNet nodes generally charge under $50 a year for access.

KEN COLLINS



***Michael Connick and his cat, Tabby, have something in common: a new program called* Tabby News.**

One of the fastest growing FidoNet conferences is EchoMac, its national Macintosh Forum. With Apple Computer and several peripherals manufacturers maintaining a technical-support presence, EchoMac has gained a reputation for helping users solve problems and providing a channel for discussing other topics of interest. Currently used by an estimated 10,000 people (and doubling in size every two months), EchoMac has become the nation's fastest growing online service for Mac owners.

Until recently, however, Macintoshes couldn't be used as FidoNet nodes, which limited the growth of the EchoMac Network. Now Michael Connick has broken that logjam by porting FidoNet to the Macintosh. Connick, a New Jersey-based computer consultant and author of *Mouse Exchange BBS,* will license his *TabbyNews* software to BBS authors looking to add FidoNet compatibility to their programs.

Scott Watson, author of the *Red Ryder* telecommunications program and *Red Ryder Host* BBS software, has already taken Connick up on his offer and has announced that the next version of *Host* will support FidoNet. This means that in the coming year many of the 400 existing *Red Ryder Host* bulletin boards will be joining EchoMac.

Two leading San Francisco Bay Area Mac advocates, Vernon Keenan of the Macintosh Tribune BBS and Raines Cohen of BMUG, have begun a campaign to encourage Macintosh user groups across the country to provide EchoMac service for their members. For more information about joining EchoMac, or to find the EchoMac bulletin board nearest you, call the MailCom Message Center in Palo Alto, California, at 415/855-9548.–*Bernard Aboba*

# The Real French Connection

Minitel of France, with its miniature interactive videotex terminals in homes and businesses throughout the country, has started a revolution in communications. Minitel's numerous "chatlines" and 6000 services are used by 4 to 5 million people in a country of only about 54 million. Customers can seek information on a variety of subjects through Minitel's many databases, as well as shop at home and set up doctor's appointments.

The vast majority of Minitel's usage, however, is on chatlines. Each chatline lets several people join in a single conversation; many of the participants then branch off into their own simultaneous private conversations.

About 200 United States and Canadian residents have al-

*(continues)*

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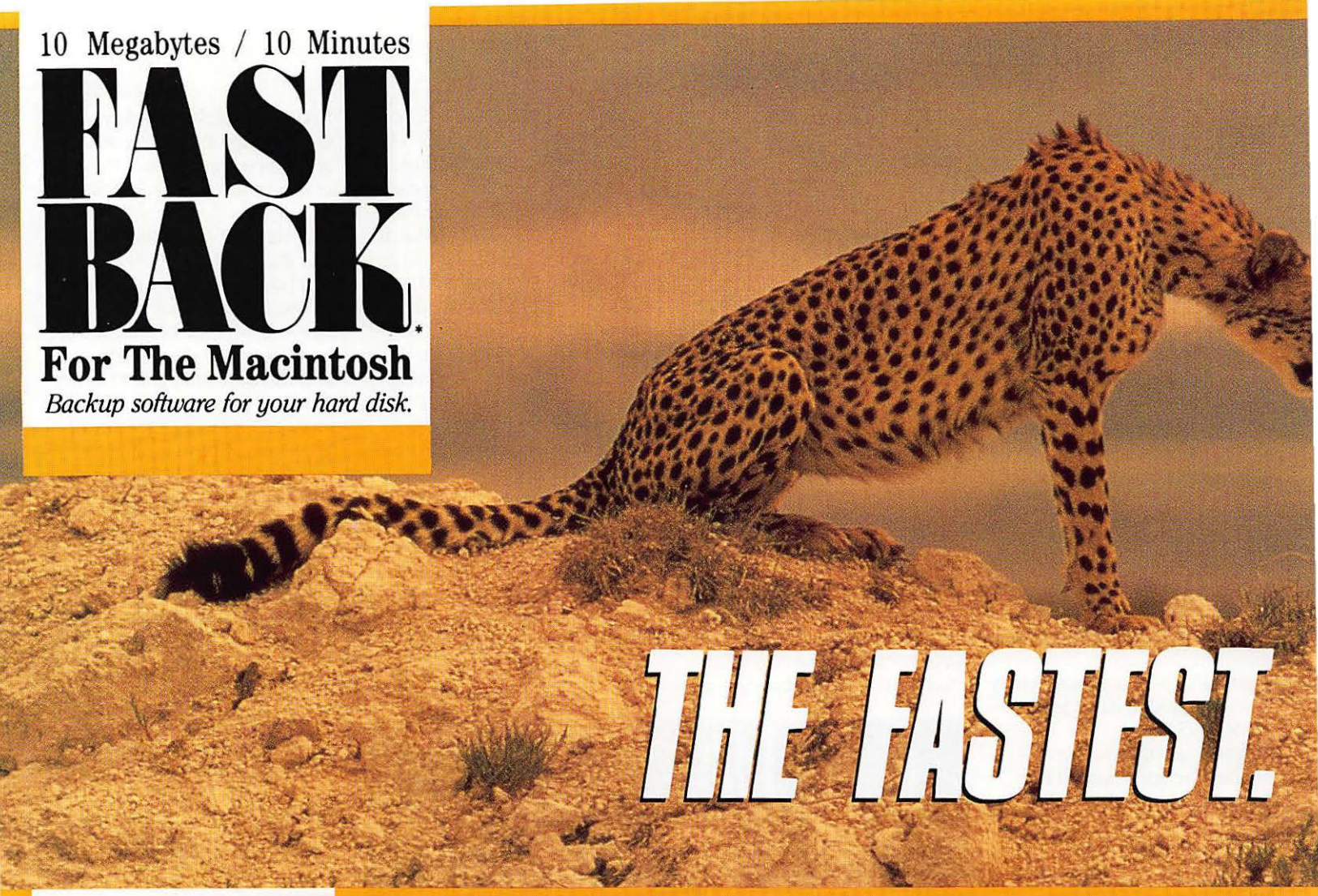


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**MacTell** ***gives Macintosh users a portal to France's Minitel communication service and its millions of enthusiastic users.***

ready developed relationships with people in France by accessing Minitel on a free trial basis. Now Minitel is being offered to everyone in the United States through a $97 Macintosh communications program called *MacTell,* which accesses both Minitel and U.S. databases and bulletin boards.

Besides emulating the Minitel terminal that's so popular in France, *MacTell* has advanced features that create macros by recording manual sign-on procedures; it features simple file-transfer, as well as file-server capabilities that turn your Mac into a mini bulletin board.

*MacTell* is offered by Baseline, which is said to be the largest online database about the entertainment industry. Baseline contains credits for more than 50,000 feature films and television productions, box-office gross receipts for the past two years, and rosters for the 400 top entertainment companies.

Because Baseline uses the Minitel format, it decided to develop *MacTell* jointly with Hello Informatique of Paris as a way to let Macintosh users in the United States utilize its Baseline database. But be careful, it's addicting. For more information, call Baseline of New York City at 212/254-8235.

## Color It Ubiquitous

Hewlett-Packard's LaserJet Series II printer, based on Canon's new SX laser printer engine, has already taken the MS-DOS market by storm. QMS is the first manufacturer to bring the SX to the Macintosh market, with the new QMS-PS810 printer. Since the SX replaces the CX engine that's in Apple's LaserWriters, you may be seeing more of this engine, providing Apple decides to stick with Canon.

Canon's SX engine improves on the CX in a number of ways. It has blacker blacks (the CX's blacks were somewhat uneven and often grayish), a 200-sheet feeder (versus 100 sheets in the CX), and correct collation. It's 10 percent smaller and 25 percent lighter than the CX. Duty cycles are unchanged at 5000 prints per month and 100,000 prints for the engine's total life.

***This QMS-PS810 is the shape of things to come in the PostScript printer world.***

If a number of laser printer manufacturers decide to use the Canon SX, they'll have to differentiate their printers based on the controllers. QMS has combined the very latest version of Adobe's Postscript with a 16-MHz processor, 2MB of RAM, and 1MB of ROM to produce 20 to 50 percent faster times for first page out and total document processing, according to the company. The QMS-PS810 controller supports 35 standard Adobe PostScript typefaces (which can be scaled upward from as small a size as 4 points) and the following resident printer emulations: HP-LaserJet+, HP 7475A plotter, and Diablo 630. The printer interfaces are serial, parallel, and AppleTalk. List price is $5495. For further information, call QMS in Mobile, Alabama, at 205/633-4300.

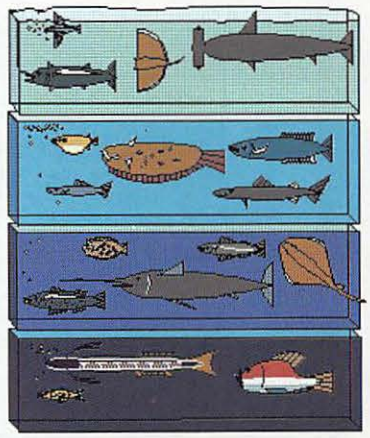
## Color Drawing from Aldus

As color editing and printing become a reality, increasing numbers of sophisticated drawing programs are coming to the Mac II. Entries into this field already include MacroMind's *VideoWorks II,* MindScape's *GraphicWorks,* Cricket Software's *Cricket Draw, Adobe Illustrator,* and SuperMac's *PixelPaint.*

Latest in the genre is *FreeHand* from Aldus, a PostScript-based color drawing program that enables you to sketch a subject and then edit each of its elements precisely in an object-oriented, PostScript-compatible format by using handles that can be manipulated like the curves in *Illustrator.*

*FreeHand* boasts a number of other features, including the ability to output color drawings as spot overlays and to process color separations with hairline registration marks for checking alignment during printing. You can view up to 200 consecutive layers simultaneously, and you can go back and redo your last eight actions.

A line of text can be bent along an irregular shape and edited for size, spacing, typeface, and color. Color and monochrome fills are available for graphics, using graduated radial, linear, or logarithmic functions. Text and graphics can be scaled, rotated, reflected, or slanted.



**FreeHand** ***from Aldus brings new capabilities to computerized sketching.***

Both PICT and encapsulated PostScript (EPS) images can be brought into *FreeHand* through the Clipboard for tracing and painting, and then exported via EPS to page-makeup and other programs. *Adobe Illustrator* files can also be opened and edited in *FreeHand.*

*FreeHand* provides nine levels of either × ½ or × 2 magnification, allows custom fills of complex shapes, creates and edits PostScript code, and saves entire designs or individual design elements as templates. *FreeHand* will list for $495 and will include 45 days of free telephone support. For further information, contact Aldus in Seattle at 206/622-5500.

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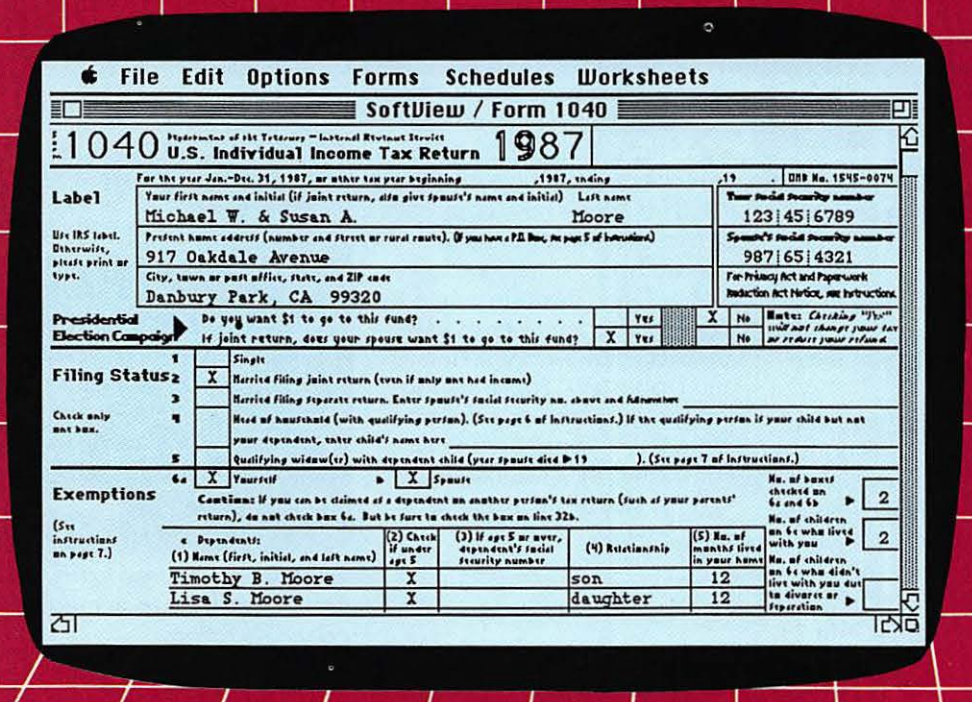


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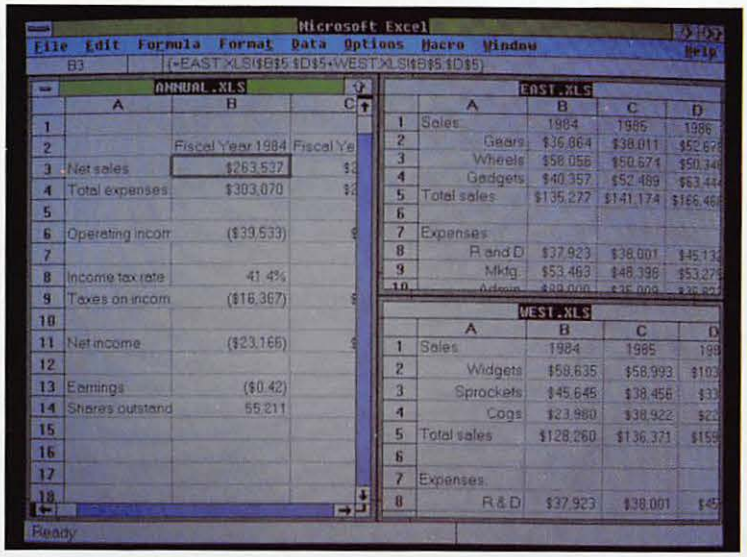



***Don't be surprised if you see more and more Macintosh programs on a Big Blue screen using Microsoft's* Windows.**

## Windows to a Different World

If your coworkers told you they just copied a chart from *Microsoft Excel* and pasted it into *PageMaker,* you might stifle a yawn and congratulate them on passing Basic Clipboard 1A. But what if they told you they did it on an IBM PC?

Impossible? Not anymore. A growing number of Macintosh programs are showing up on Big Blue screens. They're new versions specifically designed to run under *Microsoft Windows,* an operating environment that adds a multitasking graphic user interface to MS-DOS, the command-oriented operating system that powers roughly nine million IBM PCs and compatibles.

*Windows* contains a bulging toolbox of routines that programmers can use to create applications with pull-down menus, windows, scroll bars, buttons, and all the other elements of a friendly interface. While the nitty-gritty details of the routines differ from their Mac counterparts', the programming concepts for a graphic user interface are the same. Thus Mac developers have a head start over PC programmers struggling to grasp concepts like Desktops and Clipboards.

So it isn't surprising that most *Windows* applications are from Mac software firms. Leading the parade to *Windows* is *Microsoft Excel,* in a new release that should make the Mac version look feeble. For desktop publishing, there's Aldus's *PageMaker* and Letraset's *ReadySetGo.* For database management, Blyth Software offers *Omnis Quartz.* For communications, there's Palantir Software's *InTalk.* Then there's Enabling Technologies with *Pro3D* and Cricket Software with *Cricket Graph.* A person could get déjà vu.

Time will tell whether *Windows* will prove a lucrative environment for Mac software firms. But there is one clear winner now: the user. Most of these dual-environment programs can read documents created by their alter egos. That means easier data exchange between PCs and Macs, something businesses are clamoring for.

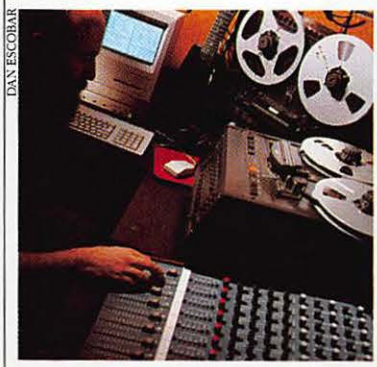
There will always be users and developers who play "us versus them," scoffing at the other camp like kids downgrading a rival school. But in the coming years, more users may be playing "us *and* them" and taking advantage of the applications and opportunities each market can offer.
*–Jim Heid*

## Treat Yourself to a Music Combo

Your Mac can be used as a playback device to create beeps and tunes using sound files, often abbreviated SND. Sound files aren't small–just four bars (8.3 seconds) of "Under My Thumb" consumes 93.5K. At that rate, 30 minutes of sound would fill a 20MB hard disk to overflowing.

Happily for music enthusiasts, MIDI files take up only 1/100 the memory of sound files, and MIDI fidelity is much, much higher. But up to now, putting MIDI to work on a Mac has meant creating a snake pit of cables and working around a troublesome shortage of ports.

No more. Opcode Systems' Studio Plus Two blends the mechanical MIDI interface with a convenient switch box that is half as tall as a hard disk and that fits under your Mac. Two short serial cables and a remote power supply are included in the $275 list price for this AppleTalk-compatible device.


DAN ESCOBAR

***OpCode's* Studio Plus Two *brings new simplicity and convenience to MIDI music.***

Studio Plus Two gives you plenty of connections: four mini jacks supply printers and modems, while eight large jacks give each port a single MIDI-in/triple MIDI-out function (as with SCSI devices, multiple MIDI instruments can be accessed simultaneously through the same port). Voilà. No irritating cable switching. Just start up a music disk, choose the sounds, and play the songs.

However, you will also need a synthesizer. A MIDI keyboard synthesizer like Casio's CZ-101 plays up to four notes at once and lists for $499; or you can use the keyless, but acoustically awesome, Yamaha FB-01, which lists for $350.

Add some MIDI software, connect your new music system to a stereo, and you're ready to create your own tunes or play those posted on bulletin boards. For more information, call Opcode in Palo Alto, California, at 415/321-8977.
*–Craig O'Donnell*

## Here Come Color Presentations

Cricket Software is rounding out its already impressive stable of graphics-oriented programs with *Cricket Presents,* a presentation graphics program that creates slides, full-page overhead transparencies, and hard-copy handouts. The program provides a basic set of drawing tools–including rectangles, circles, arrows, lines, grates (parallel lines), and balloons. In addition to its own graphics, the program can use graphics from

*(continues)*

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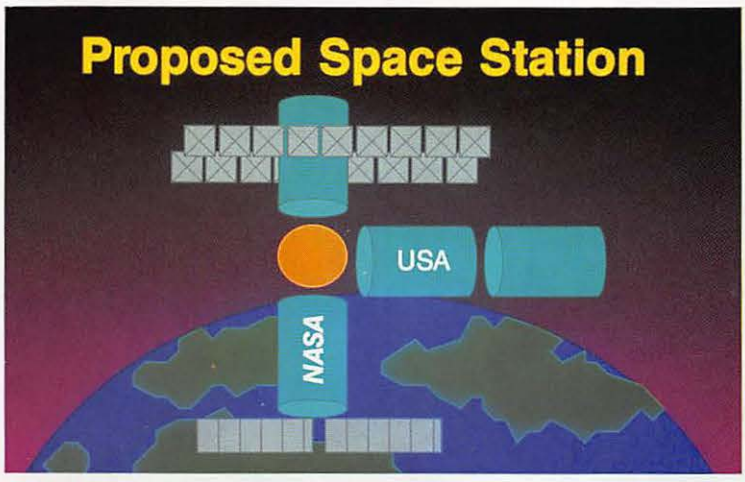



**Cricket Presents' *color drawing tools will produce attention-getting presentations.***

other programs if they are saved in PICT format.

*Cricket Presents* has powerful text-handling capabilities that use new non-PostScript outline fonts to produce better-quality type. According to Cricket Software, this is because projections require a higher level of quality than bit-mapped fonts provide. As a result, output devices for *Cricket Presents* are not limited to PostScript printers.

The program works with about three dozen Chooser-selectable output devices, including the HP LaserJet, the Xerox 4020 ink-jet printer, Calcomp's PlotMaster thermal printer, Matrix film recorders, and both Magicorp and Compufilm slide service facilities. For further information, contact Cricket Software at 215/251-9890.–*Brita Meng*

## Room to Roam

Let's face it, it's nearly impossible to have a really useable desk when a computer is sitting right there in the middle of it–especially when the computer happens to be a Mac II with a huge, 19-inch color monitor.

Ergotron has come up with a solution, called the Engineering Workstation for Mac II, which should be especially appreciated in an engineering or architectural setting. This workstation holds the Mac II above the desk and suspends a 17- or 19-inch color monitor above the desk. The keyboard sits on the user's lap or on a movable shelf underneath the desk.

Ergotron's unit permits users to change the monitor's position–just a touch of the hand moves the monitor forward or backward and adjusts the viewing angle. Arrange the monitor so as to reduce reflection from ceiling-mounted lighting, wear a darkish shirt or blouse, and you'll be looking at an almost glareless screen.

Suggested list price for this space-saver is $499.95. A lighter-duty system for all Macs and smaller monitors will be announced soon. For more information, call Ergotron in Minneapolis at 800/328-9839.

BOB CUNNINGHAM

***This desk is free of computers and monitors thanks to a new engineering workstation platform from Ergotron.***

## An Internal 2400-Baud Modem

The first manufacturer to offer an internal modem for the SE or Mac II is Epic Technology. An external version of the 2400-baud modem serves the Mac Plus, 128K, and 512K.

Epic's 2400-baud modem also works at 1200 and 300 baud. It will be upgradeable to 4800 baud using a data-compression format now being developed by Epic. Data correction and data encryption will also be part of a future upgrade.

Regular features of Epic modems include auto-dial, auto-answer, audio monitor, call-progress detection, multiline capabilities, data-to-voice switching, automatic speed and parity formatting, self-test modes, and a five-year warranty.

Epic's modems are based on digital signal processing, which makes them less susceptible to noise on long-distance telephone lines–especially when Epic modems are used on both ends of a link. This immunity from line noise comes from an adaptive mechanism, which includes automatic equalization and retraining.

Internal modems for the SE and II list for $349, while an external modem for any computer with an RS-232C serial port costs $189. For more information, call Epic in Fremont, California, at 800/634-9992 (415/683-0932 within California). □

## Your Best Stacks

*Send a disk of your best* HyperCard *stacks to: News Editor,* Macworld, *501 Second St., San Francisco, CA 94107. We'll pay $25 for every entry selected for a new monthly item, "Your Best Stacks." Please tell us how you developed your stack, describe its features and who would use it, and let us know how readers can obtain more information. We'll also need to know if it's free, shareware, or a commercial product.*

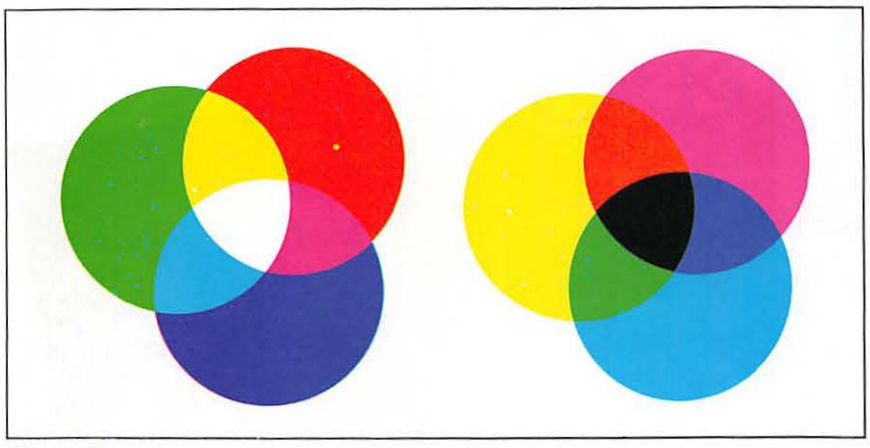


***Figure 1***
*Combining the three primaries in an additive (light) color system produces white, while combining the primaries in a subtractive (pigment) system results in black.*

### Color Lookup

The Mac II is currently capable of displaying 256 colors at a time. Where does this number come from? Anyone who is familiar with *MacPaint* or a similar black-and-white paint program knows that any given pixel can be either black or white. Shades of gray are produced with patterns of black pixels and white pixels. In this *1-bit* system, each pixel contains 1 bit (a binary digit) of information: 1 for on or 0 for off. (In the computer's binary numbering system, $2^1 = 2$ color possibilities.) The Mac II's video card allows each pixel to contain 8 bits of information ($2^8 = 256$ color possibilities). When you look at *PixelPaint*'s palette, you'll see a grid of 256 squares, each filled with a different color.

Computer artists are not limited to 256 colors, however, but to 256 colors *at once*. Color paint programs access a matrix of information in video RAM called a *color lookup table*. Each entry in the table contains a 24-bit number; $2^{24}$ results in more than 16 million possible colors (16,777,216 according to my Calculator desk accessory; in analog terms, this would equal enough Crayola crayons, laid end-to-end, to stretch from Denver to Las Vegas). Although 256 colors will meet the needs of many computer artists, even this number is inadequate for graphics that strive toward photographic realism or airbrush-smooth color gradations. *Color banding,* visible transitions within color regions that should blend smoothly, is common in 256-color systems. For smooth transitions from one color to another, more bits are required, although *Modern Artist*'s Random Dither Option alleviates the problem somewhat, offering nearly 6 million virtual, or perceived, colors to improve blending. In addition, 24-bit video cards that will display all 16 million colors at once are in the works. Most users won't feel compelled to save up for one, however. Besides, 256 colors will suffice for many graphic arts applications.

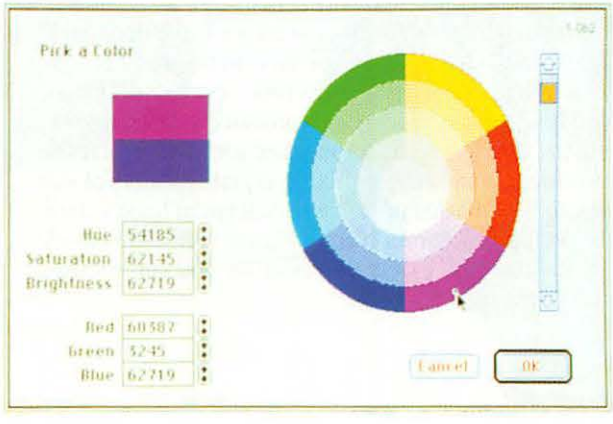



***Figure 2***
*To change colors,* PixelPaint *directly accesses Apple's Color Picker. The Color Picker provides graphic and numeric information about a color's hue, saturation, and value, presenting immediate feedback as colors are adjusted.*

### Mix It Up

Even if the discussion so far has you mixed up, there's no reason you can't mix up some colors on the Mac. *PixelPaint* and *Modern Artist* take similar approaches to the *color palette*–the selection of colors used in a painting. *PixelPaint*'s palette displays 256 colors, while *Modern Artist*'s displays 92. (To create the appearance of additional colors, *Modern Artist* employs a technique called *dithering,* mixing pixels of various colors and densities into clusters that the eye perceives as different colors.)

With only three primary colors per pixel, how can 16 million colors be created? Additive color mixing involves three components: hue, value, and saturation, each of which can be adjusted. *Hue* is the primary color, or a secondary color created by mixing primaries (red, blue, yellow, and purple are examples of hues). *Value,* also called *brightness* or *luminance,* is the lightness or darkness of a color from white to black. *Saturation,* also called *chroma* or *intensity,* refers to the purity of a color–its brightness or dullness. Pure hues are made less intense by adding either gray or the *complement* of the hue–the color opposite the hue on a color wheel.

*PixelPaint* and *Modern Artist* use similar color editors to represent the three components: hue, value, and saturation. Each program displays a *color wheel*–a circle made up of six hues. In *PixelPaint* the circle is divided into six wedges; *Modern Artist*'s circle displays a band of hues around its circumference. *PixelPaint*'s wedges of color become progressively grayer toward the center of the circle, representing changes in saturation from a pure hue to a shade of gray containing only a trace of the hue. Both programs represent value with a scroll bar; move the slider up to add white to a color and down to add black (see Figure 2).

A small dot within the circle represents the current color's position on the color wheel. The color itself appears in a nearby box and changes dynamically

# New Life for an Old Mac

*by Brita Meng*

*Upgrade–and increase the performance of your 128K, 512K, or Mac Plus. While it may postpone that Mac II purchase, is it worth it?*

Enhancing your 128K, 512K, or Plus is the surest way to revitalize its performance while preserving your original investment. By adding more memory, a SCSI port, and an accelerator, your Mac can run MultiFinder and the newest applications with ease and–in some cases–even outrun a Mac II.

Before you start out, you should carefully evaluate your options. And there are plenty. But beware: some upgrades will cause incompatibility problems down the road; others are not expandable beyond what they offer now.

PHOTOGRAPHS BY FRED STIMSON

### Memory Lane

What should you know if you want to add memory to your Mac? Most important, that the Mac model you have affects your memory upgrade options. Second, that 1MB of memory is not enough–especially if you plan on running *HyperCard* or MultiFinder. (Apple now recommends 2MB for these programs; some Apple dealers even say 4MB.)

**128K and 512K Macs** If you have a 128K, 512K, or 512KE Mac, the memory is composed of random-access memory (RAM) chips soldered onto the Mac system board. The 128K machine uses sixteen 64-kilobit chips; the 512K and KE contain sixteen 256-kilobit chips.

You should be aware that memory chips come in different densities: 64 kilobits, 256 kilobits, and 1 megabit. For example, a 256-kilobit chip can store 256,000 bits of information, but only 1 bit is accessible at a time. Because memory is measured in bytes, units made up of 8 bits each, it takes eight chips to make 1 byte of Mac memory. 512K (kilobytes) of memory requires sixteen 256-kilobit chips, or two sets of 256K. Similarly, 1MB (megabyte) of memory requires either thirty-two 256-kilobit chips or eight 1-megabit chips.

Although Apple has discontinued its 512K upgrade for the 128K Mac, you can still find a few vendors that offer it. The upgrade replaces the 64-kilobit RAM chips with 256-kilobit RAM chips. To do this, you (or whoever installs the upgrade) must unsolder the 64-kilobit chips and solder the 256-kilobit chips to the system board. In some early 128K Macs, you must also modify a trace (an etched line) on the system board. The 512K upgrade doesn't offer as much potential as it did two years ago; you probably shouldn't do it unless it's all you can afford.

A better solution is to upgrade your 128K or 512K to 1MB or 2MB of memory. These upgrades use special sockets, or clips, to attach expansion boards containing memory to the Mac system board. Installing these upgrades is much easier than installing 512K upgrades –you certainly don't have to worry about unsoldering and soldering RAM chips. Nevertheless, the clips can be tricky to place. If you carry your Mac around regularly, you'll want to make sure that the upgrade you install uses clips that won't come loose in transit.

**ROM Questions** The 128K ROMs, which Apple introduced in the Mac Plus, are crucial for avoiding Mac obsolescence. These ROMs include an improved version of QuickDraw; the hierarchical file system (HFS); and the commands necessary for accessing SCSI devices.

The 128K ROMs make for better Mac performance. But there are other aspects to consider. More programs now require the 128K ROMs. If you have the 64K ROMs, which were standard in earlier Macs, you won't be able to run those programs. Nor will you be able to use HFS, access file servers, or attach hard disks of over 32MB.

So if future expandability is vital to you, install the Mac Plus upgrade in your 128K, 512K, or 512KE. This upgrade comes in two parts and is available only from Apple dealers.

The Disk Drive Kit costs $299 and includes the 128K ROMs and the 800K internal floppy drive. Since the 128K ROMs don't work with less than 512K of memory, 128K owners must get a memory upgrade too.

If you want to install the Logic Board Kit, which includes the SCSI port and 1MB of memory, you must also get the Disk Drive Kit. That's because the SCSI port and 1MB of RAM both require 128K ROMs. To up-

## SCSI Ports

| Company | Product | Description | Macs Supported | Price |
|---|---|---|---|---|
| Dove Computer | MacSnap SCSI | Battery-door port access | 512KE | $149.00 |
| MacProducts USA | Magic SCSI Port | Printer port access; removable | 512KE | $69.00 |
| Microtech Peripherals | SCSI Port | Battery-door port access | 512KE | $95.00 |
| OpenMac Enterprises | SCSI Mac | Battery-door port access | 512KE | $99.95 |
| Peripheral Land | MacPort Plus | Battery-door port access | 512KE | $189.00 |
| Relax Technology | Relax SCSI Port | Printer port access | 512KE | $99.00 |
| SuperMac Technology | DataPort | Battery-door port access | 512KE | $149.00 |
| Warp Nine Engineering | PlusPort | SCSI port; interface board doesn't require new 128K ROM | 512K, 512KE | $139.00 |

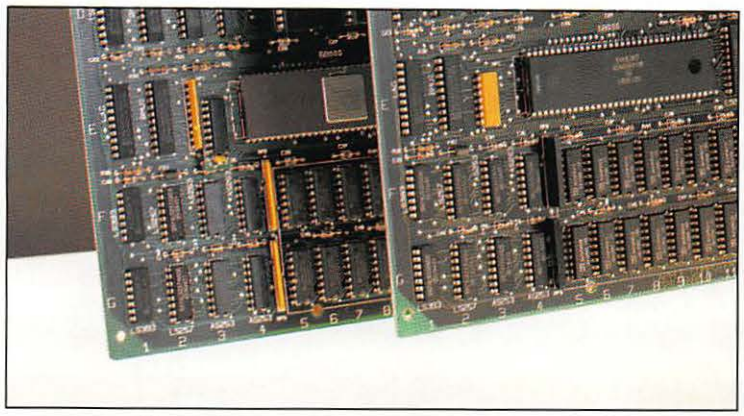


***Figure 1***
*The differences between a 128K Mac system board upgraded to 512K (left) and a standard 512K board are subtle. Other than adding the denser RAM chips, the 128K upgrade requires a small circuit board at the left of the large 68000 chip.*

grade the 512KE to a Plus, all you need is the Logic Board since you already have an 800K internal floppy and 128K ROMs. The Logic Board Kit upgrade costs $599 for a 512K Mac and $799 for a 128K Mac.

If you don't upgrade to 128K ROMs, you may have to pay a little more for the 64K ROM memory enhancements. For example, Dove's 524 upgrade (for the 512K) includes a small auxiliary ROM card so the Mac can use the extra memory. Dove's 524E (for the 512KE) doesn't. You pay $30 extra for that auxiliary card in the 524 upgrade. At least, when you change ROMs, you can pull off the auxiliary card and the memory will run fine.

**Mac Plus and SE** Apple changed the mounting system for the memory chips in the Mac Plus and Mac SE. Rather than soldering the chips directly onto the Mac system board, the memory chips mount on Single Inline Memory Modules (SIMMs) (see Figure 1).

A SIMM is actually a small circuit board with eight memory chips soldered onto it. These SIMMs plug into sockets on the Mac system board. The Mac Plus or SE has four SIMMs with eight 256-kilobit RAMs on each, totaling 1MB of RAM.

Increasing the memory in a Mac Plus or Mac SE is much easier than in the 128K or 512K, because all you do is substitute new SIMMs, each containing eight 1-megabit RAMs, for the old. Apple has a standard design for upgrade SIMMs; if the SIMMs you buy meet Apple's design, you can plug them directly into the old SIMM sockets.

The standard design also means you may be able to move your SIMM upgrades from a Mac Plus to an SE or even a II, if you wish. However, you should know that different Mac models require memory chips of different speeds. The Mac Plus uses 200-nsec (nanosecond) memory, the SE needs 150-nsec chips, and the Mac II requires 120-nsec memory chips. If you plan to move to a different Mac and want to take your SIMMs along, make sure you ask the vendor the speed of the RAM. Otherwise, you may get caught with not-quite-fast-enough memory.

You can expand memory to 2MB, 2.5MB, or 4MB with the SIMM sockets in the Mac Plus and SE. Some vendors provide a *banana board* or *carrier board* that utilizes the four present SIMMs during memory expansion. The banana board has four of its own SIMM sockets, into which you plug the old SIMMs; the board then plugs into one SIMM socket on the Mac system board (see Figure 2).

If you are using a banana board, make sure the board doesn't hang over the microprocessor. When this happens, the processor's air circulation is blocked, and it may overheat. Banana boards may also be incompatible with further internal enhancements, like accelerators, because they take up room inside the Mac.

**Know Your SIMM** It's important to know which type of SIMM you should buy, because the wrong decision may prevent further enhancement of your Mac. The chips on the SIMM come in two types: surface mount and DIP (see Figure 3).

The DIP SIMM is taller than the surface-mount SIMM. As a result, some internal devices, like accelerator boards and large-screen monitor controllers, simply won't fit inside your Mac if you do use DIP SIMMs. Installing DIP SIMMs, in fact, blocks the SE expansion slot. MacProducts USA claims it has modified its DIP SIMMs' profiles to allow internal devices.

Because of their lower profile, surface-mount SIMMs don't cause compatibility problems with inter-

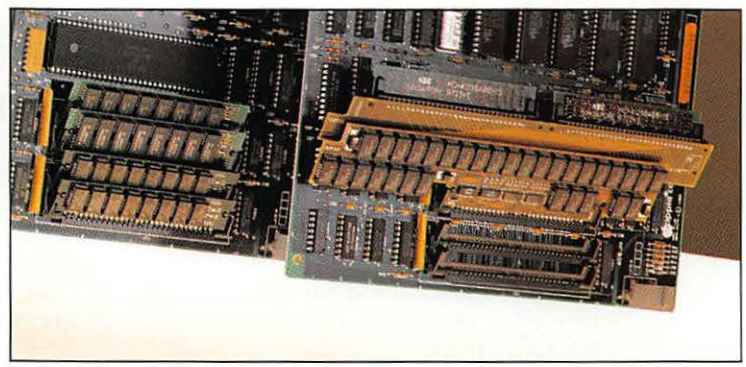


***Figure 2***
*A banana, or carrier, board (right) lets you preserve your investment in the existing SIMMs. The SIMMs plug into the carrier board, which then plugs into one SIMM socket.*

## Accelerator Boards

| Company | Product | Macs Supported | Processor | On-Board Memory | FPU | MMU |
|---|---|---|---|---|---|---|
| General Computer | HyperCharger 020 | SE | 16-MHz 68020 | 1MB to 4MB, standard SIMMs | optional | no |
| Levco | Prodigy 4 | 128K, 512K, 512KE, Plus | 16-MHz 68020 | 4MB RAM | optional | no |
| Mac Advance | MacGusto II | 512KE | none | up to 2.5MB RAM with chips | optional | no |
| MacMemory | TurboMax | 512KE, Plus | 16-MHz 68000 | 1.5MB to 4MB | optional | no |
| MacMemory | Turbo SE | SE | 16-MHz 68000 | 1MB to 4MB | optional | no |
| MacPeak Systems | Orion | SE | 16-MHz 68020 | 1MB to 8MB, standard SIMMs | optional | optional |
| MacPeak Systems | Orion 25 | SE | 25-MHz 68020 | 1MB to 8MB, standard SIMMs | optional | optional |
| MacProducts USA | Magic 020 | Plus | 12.5-MHz 68020 | none | included | no |
| Network Specialties | Jump 020 | 512KE, Plus | 12-MHz 68020 | 1MB to 4MB | optional | no |
| Novy Systems | Mac20MX | 512KE, Plus, SE | 12-MHz 68020 | up to 4MB | optional | no |
| Novy Systems | Mac20MX | 512KE, Plus, SE | 16-MHz 68020 | up to 4MB | optional | no |
| Novy Systems | Mac20MX | 512KE, Plus, SE | 20-MHz 68020 | up to 4MB | optional | no |
| Novy Systems | Mac20MX | 512KE, Plus, SE | 24-MHz 68020 | up to 4MB | optional | no |
| Radius | Accelerator | 512KE, Plus, SE | 16-MHz 68020 | 32K cache | optional | no |
| Ryad | MacEngine GT | 128K, 512K, 512KE, Plus | 16-MHz 68000 | up to 4MB | no | no |
| Ryad | MacEngine Turbo | 128K, 512K, 512KE, Plus | 16-MHz 68020 | up to 4MB | optional | no |
| Spectra Micro Development | MacAccelerator | 512KE, Plus, SE | 12-MHz 68020 | none | included | no |
| SuperMac Technology | Prodigy SE | SE | 16-MHz 68020 | 1MB to 8MB | included | no |
| Total Systems Integration | TSI-020 | 512KE, Plus, SE | 12-MHz 68020 | up to 4MB | optional | no |
| Total Systems Integration | TSI-020 | 512KE, Plus, SE | 16-MHz 68020 | up to 4MB | optional | no |

**All prices are for minimum memory.*

nal enhancements. If you foresee adding either a large screen or accelerator to your Mac, the surface-mount SIMMs are a must.

### To SCSI and How

If you want a SCSI port for your Mac, you must have the 128K ROMs. The 64K ROMs don't have the commands needed to control a SCSI device. However, Warp 9 Engineering says that with its special interface board, which includes a ROM, you can install the Plus-Port (a SCSI port) in a 512K Mac.

SCSI-port boards piggyback either onto the 68000 microprocessor or onto the ROM sockets. Most contain connectors that exit from the Mac's battery compartment. Most vendors provide a special replacement door to accommodate the battery and the SCSI connector. (Exceptions to this are SCSI ports from MacProducts USA and Relax Technology. They extend a flat-ribbon cable with a connector over the printer port without blocking it.)

There are two things to consider when you're looking for a SCSI port. First is compatibility. For example, SuperMac's DataPort is not compatible with anything but SuperMac hard drives. And until Jasmine rewrote its hard disk driver, Jasmine drives weren't compatible with Dove's SCSI port.

| Expansion Port | Other | Price* |
|---|---|---|
| The Big Picture | | $1699 |
| MegaScreen Plus | clip-on board; includes fan, power supply, SCSI port, and RAM disk | $3495 |
| n/a | SCSI | $219 |
| The Big Picture | clip-on board; includes fan, power supply, SCSI port, and RAM disk | $1395 |
| The Big Picture | | $599 |
| Galaxy adapter option | | $1395 |
| Galaxy adapter option | | $3995 |
| n/a | CPU can be upgraded to 68030 with no changes to board | $595 |
| StretchScreen and StretchProjector | clip-on board; CPU can run at 16 and 24 MHz | $999 |
| n/a | clip-on board; fan, power supply, and SCSI port optional | from $695 |
| n/a | clip-on board; fan, power supply, and SCSI port optional | from $1095 |
| n/a | clip-on board; fan, power supply, and SCSI port optional | from $1395 |
| n/a | clip-on board; includes fan, power supply, and SCSI port | from $4295 |
| Full Page Display (SE only) | | $995 |
| n/a | includes fan, power supply, SCSI port | $595 |
| n/a | includes fan, power supply, SCSI port | from $695 |
| The Big Picture | clip-on board; includes C compiler and assembler | $695 |
| The Big Picture | includes RAM disk; uses ZIPs for on-board memory | $1495 |
| n/a | clip-on board; includes fan, power supply, and SCSI port | $695 |
| n/a | clip-on board; fan, power supply, and SCSI port optional | $1095 |

John Sawyer, chief technician at CJS Systems, has seen many SCSI drive incompatibilities. He recommends that before buying any SCSI drive and SCSI port, you check with both vendors about compatibility.

Another concern is clip reliability. Many SCSI ports require spring-loaded clips (see Figure 4) in addition to the ROM clip. These spring-loaded clips attach to various wires inside the Mac. They are also not terribly reliable as far as bangs and bumps go. If you don't move your Mac around a lot, these clips don't pose a problem. If you do, check and see if your dealer can solder the clips to the correct wires.

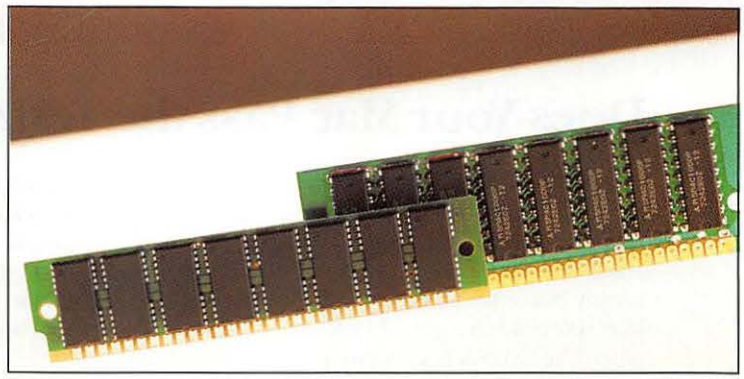


***Figure 3***
*SIMMs differ in the types of RAM chips they contain. The most common chip is the surface-mount chip (left). SIMMs that use the DIP-style chips (right) are taller and may conflict with some add-on boards.*

The method of attaching the SCSI port to the ROM sockets could also pose reliability problems if you later remove the SCSI port from the Mac. Most SCSI upgrades involve removing one of the ROM chips and plugging a piggyback connector into the socket. You then plug the ROM into the upgrade board. The problem arises because the piggyback connector actually spreads the pins inside the ROM socket. When you remove the SCSI upgrade and plug the ROM back into the socket, the socket no longer grips the chip lead—often resulting in intermittent problems. To get your Mac up and running again, you'll have to buy new ROM sockets. MacProducts USA says it's solved this problem with its SCSI port.

### The Need for Speed

No doubt about it, accelerator boards can really speed up your Mac—whatever the model. The question is, how fast and how compatible do you want it?

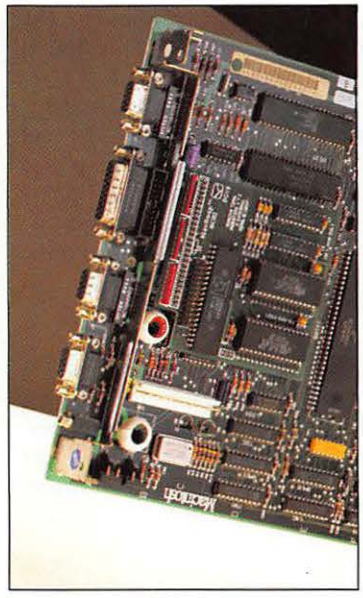


***Figure 4***
*To install Dove's MacSnap SCSI, you transfer the ROMs from the system board to the SCSI board. Dove's board then plugs into the ROM sockets. A cable attaches to the board and terminates in the SCSI connector, which mounts in the battery compartment at the rear of the Mac.*

## Does Your Mac Pass the Test?

The Achilles' Heel of the Mac has always been its power supply. When you upgrade the Mac, reliability of the power supply becomes an issue. Many Mac screens have gone black when the flyback transformer overheated. The flyback transformer, located on the analog board, is responsible for drawing the images on the Mac's CRT screen. If your Mac screen shakes or flickers on the sides, you may have a problem.

Early Macs–128K and 512K–are particularly susceptible to flyback-transformer burnout. According to David Goldman, owner of MacProducts USA, that's because the part was defective in those first machines.

You can check whether your Mac might be an unsuspecting victim, but you must open it up to be sure. Look on the top-right side of the Mac. You'll see a suction cup attached to the monitor.

DON'T TOUCH THE CUP!!! It can have a 40,000-volt charge on it.

If your suction cup is black, it's bad news. It's definitely one of the defective flybacks. If the suction cup is clear, trace–not with your finger–the cable back to its connector.

If the connector has a white base, John Sawyer of CJS Systems says there also may be trouble. While these flybacks aren't as susceptible to burnout as the ones in systems with black suction cups, Sawyer claims, he's starting to see more of them burning out.

If your flyback transformer doesn't match these descriptions, you're fine.

If it does, you can get the problem fixed by an Apple-authorized dealer, who must swap the entire analog board for a new one. Apple doesn't allow dealers to work on specific parts, so the entire board must be replaced. Or you can find a service shop such as CJS Systems, which is not an Apple-authorized dealer, that will simply replace the flyback transformer.

There are basically two types of accelerator boards to choose from. The first uses a 16-MHz 68000 processor, which will let your Mac run up to twice as fast as an SE. Because these boards use the same processor as the SE, you won't have to worry about software compatibility.

The second kind of accelerator board usually uses a 16-MHz 68020 microprocessor–twice as fast as the 8-MHz 68020 in the Mac II. You get blazing speed, but you also have lots of software incompatibilities (see "Just How Compatible Is Compatible?" *Macworld,* November 1987). Software that doesn't run on the Mac II won't run on a 68020-based accelerator board.

If you really need the speed–and if you can live with the price and the incompatibilities–a 68020 accelerator is the only way to go. When you buy one, you should check to see if there's a way to override the accelerator board at start-up (something you can't do with a Mac II). This feature allows you to turn off the 68020 and revert back to the original 68000 to run incompatible programs.

### Upgrading the Upgrade

Buying an accelerator board amounts to buying a new Mac system. Most have their own enhancements for memory, coprocessors, SCSI ports, and even large-screen monitors–sort of mini-Macs in their own right. You should evaluate accelerators as carefully as you would a computer.

One thing to consider might be memory on the accelerator. If you find yourself craving memory–or think you will–memory expandability is important.

There are two ways to expand memory with an accelerator. First is to enhance the memory on the Mac system board. The second is placing memory directly on the accelerator board. If you have a 68020 accelerator, this on-board memory will result in faster performance for some heavy-duty applications.

That's because the 68020 transfers 32 bits at a time to and from memory. If you use memory only on the Mac system board, the 68020 is forced to slow down. The Mac bus that the bits travel down to system board memory can accommodate only 16 bits at a time.

With the exception of a 32K cache, Radius doesn't include any memory on its Accelerator. MacPeak's Orion, on the other hand, has eight SIMM sockets (same as in the Mac II), so that you can expand memory to 8MB. SuperMac's Prodigy SE can accept up to 4MB but uses special memory called ZIPs to do so. ZIPs are not the same as SIMMs, and the only place you can buy them for the Prodigy is from SuperMac. (SuperMac is considering a future redesign of the Prodigy SE that will use Apple standard SIMMs.)

Coprocessor support is another thing to consider. If you find yourself going for a cup of coffee between spreadsheet calculations, a math coprocessor–the 68881 chip–will help.

Some cards include a memory management unit, the 68851 chip. This chip allows the Mac to manage much larger amounts of memory. The only software that uses the 68851 is A/UX. But even though some accelerator boards use the same 68851 as the Mac II, implementations do differ. As a result, some accelerators may not be compatible with A/UX. Since A/UX is not yet released, accelerator vendors can't really test for compatibility.

Accelerators for the Mac 128K, 512K, and 512KE–even for the Mac Plus–can provide SCSI port options. Again, check for compatibility between the SCSI port and disk drives.

**Large-Screen Monitor Support** Installing an accelerator doesn't preclude other peripheral enhancements. Most accelerator vendors either have expansion connectors on their boards or offer them as options. The most popular choice for further expansion is a connector for large-screen video controllers (see Figure 5). But not all screens work with all accelerators. For example, General Computer's HyperCharger 020 only supports E-Machines' The Big Picture; Network Specialties' Jump 020 works only with the company's StretchScreen or StretchProjector. If you already have a large screen, or plan to purchase one, it's vital to check with the vendor for large-screen compatibility.

An interesting expansion scheme comes from Second Wave, which offers the ExpanSE. The ExpanSE is a chassis that accepts up to four SE option boards. It has its own interface board, which goes inside the Mac SE. Provided that the four boards don't overlap address spaces, you can run them all at the same time–for example a Kinetics Ethernet board, a MacPeak Orion accelerator, an E-Machines monitor, and a National Instruments test controller. And by the time you read this, Second Wave will probably have announced a version of the chassis for the Mac Plus, tentatively called ExpanSE Plus.

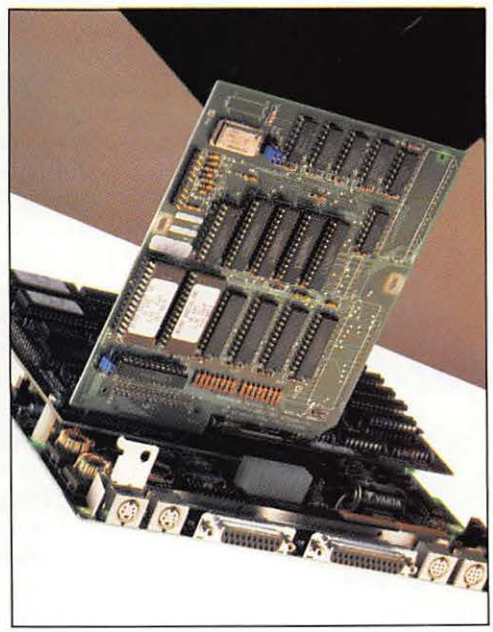
### Cooling Down

When you upgrade your Mac, you increase the load on the *power,* or *analog,* board. Because more power is needed, the analog board must work harder. This increases the heat inside the chassis–which can be fatal to your Mac (see "Does Your Mac Pass The Test?").

Manufacturers disagree on whether a fan is necessary for a memory upgrade. Dove, for example, says that its CMOS memory upgrades can draw less power than the original NMOS memory in your Mac. As a result, Dove doesn't recommend buying a fan. Other vendors, like SuperMac, do sell piezoelectric fans bundled with their memory upgrades.

It's your decision to buy, or not to buy, a fan for your Mac memory upgrade (For a comparative guide to fans see "Mac System Tools," *Macworld,* November 1987). But you should keep one thing in mind. Some vendors do extensive testing on the memory chips used in their upgrades. That testing ensures the reliability and quality of those chips; it also costs money. Beware of companies offering memory upgrades at outrageously low prices; they probably haven't done quality testing. If price is your main criterion when you buy memory upgrades, especially SIMMs, you might consider spending the money saved on a fan.

An accelerator definitely generates additional heat inside the Mac and definitely uses extra power. The SE already has a fan, so it's not a problem. However, you



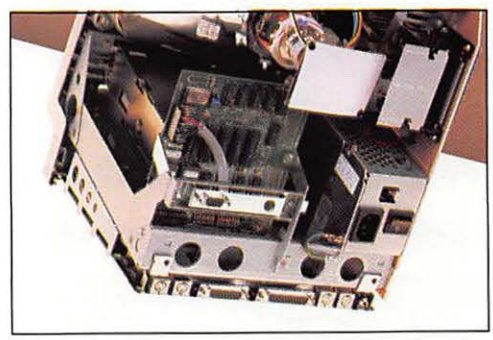


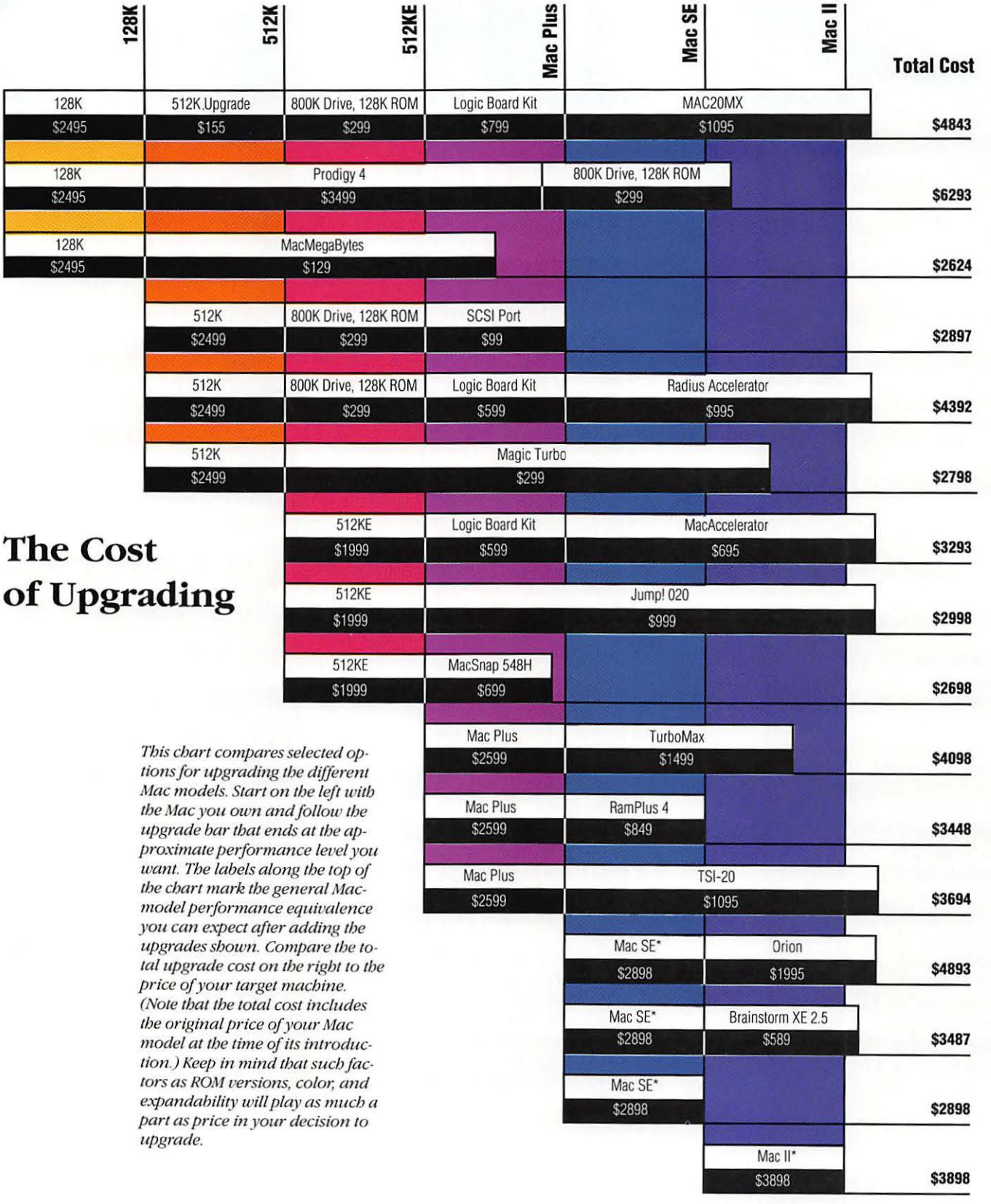
***Figure 5***
*Manufacturers like Radius provide for additional upgrades with an expansion connector on their accelerator boards. The Radius Accelerator attaches to the SE's expansion slot. The Radius Full Page Display card then plugs into the expansion slot on the accelerator board.*

# Memory

| Company | Product | Description | Macs Supported | Price |
|---|---|---|---|---|
| Apple Computer | 2MB Upgrade | two 1MB SIMMs | Plus, SE | $599 |
| CDC Enterprises | 1-megabit × 8 | 1MB CMOS SIMMs, sold in pairs only | Plus, SE | $229 |
| CDC Enterprises | 256K × 8 | 256K SIMM | Plus, SE | $45 |
| Dove Computer | MacSnap Model 524 | 1MB upgrade | 512K | $269 |
| Dove Computer | MacSnap Model 524E | 1MB upgrade | 512KE | $239 |
| Dove Computer | MacSnap Model 524S | 1MB upgrade with SCSI port | 512KE | $339 |
| Dove Computer | MacSnap Model 548 | 2MB upgrade | 512K | $629 |
| Dove Computer | MacSnap Model 548E | 2MB upgrade | 512KE | $599 |
| Dove Computer | MacSnap Model 548S | 2MB upgrade with SCSI port | 512KE | $699 |
| Dove Computer | MacSnap Model 548H | 2MB upgrade, HyperDrive compatible | 512KE | $749 |
| Dove Computer | MacSnap Plus 2 | 2MB nonexpandable upgrade | Plus | $449 |
| Dove Computer | MacSnap Plus 2H | 2MB to 4MB upgrade with 1MB CMOS chips | Plus | $749 |
| Dove Computer | MacSnap 2S | 2MB to 4MB SIMM upgrade | Plus, SE | $749 |
| Dove Computer | MacSnap 4H | 4MB upgrade with 1-megabit CMOS chips | Plus | $1495 |
| Dove Computer | MacSnap 4S | 4MB SIMM upgrade | Plus, SE | $1495 |
| Data Memory Systems | Accu SIMMs | 1MB CMOS SIMMs, sold in pairs only | Plus, SE | $575 |
| Ehman Engineering | 512K Upgrade | 512K upgrade | 128K | $199 |
| Ehman Engineering | Dove 524O | 1MB upgrade | 512K | $269 |
| Ehman Engineering | Dove 524E | 1MB upgrade | 512KE | $239 |
| Ehman Engineering | Dove 524S | 1MB upgrade with SCSI interface | 512KE | $339 |
| Ehman Engineering | Dove 548O | 2MB upgrade | 512K | $629 |
| Ehman Engineering | Dove 548E | 2MB upgrade | 512KE | $599 |
| Ehman Engineering | Dove 548S | 2MB upgrade with SCSI interface | 512KE | $699 |
| Ehman Engineering | Dove 548H | 2MB upgrade, HyperDrive compatible | 512KE | $749 |
| Ehman Engineering | Dove 201 | 2MB nonexpandable upgrade | Plus | $449 |
| Ehman Engineering | Dove 204H | 2MB to 4MB upgrade with 1-megabit CMOS chips | Plus | $749 |
| Ehman Engineering | Dove 206S | 2MB to 4MB SIMM upgrade | Plus, SE | $799 |
| Ehman Engineering | Dove 401H | 4MB upgrade with 1-megabit CMOS chips | Plus | $1699 |
| Ehman Engineering | Dove 402S | 4MB SIMM upgrade | Plus, SE | $1799 |
| Hard & Soft | MemChips | two 1MB SIMMs | Plus, SE | $497 |
| Levco | MonsterMac | 1MB to 2MB upgrade; includes SCSI port, fan, expansion port; improves Mac speed 25%; optional RAM disk | 128K, 512K, 512KE | $712 |
| Levco | 512K Upgrade | 512K upgrade kit | 128K | $155 |
| Mac Advance | MacGusto I | up to 1MB RAM with chips, SCSI port, 68881 socket | 512KE | $160 |
| MacDoctor Electronics | Brainstorm | 1MB upgrade | 128K | $429 |
| MacDoctor Electronics | Brainstorm | 1MB upgrade | 512K | $379 |

| Company | Product | Description | Macs Supported | Price |
|---|---|---|---|---|
| MacDoctor Electronics | Brainstorm | 1MB upgrade | 512KE | $329 |
| MacDoctor Electronics | Brainstorm XE 2.5 | 2.5MB upgrade | Plus, SE | $589 |
| MacDoctor Electronics | MacDoctor 512 | 512K upgrade | 128K | $189 |
| | | | | |
| MacMemory | MultiSIMMs | 1MB SIMMs, sold in pairs only | Plus, SE | $899 |
| MacMemory | MaxPlus Mega | 2MB SIMM upgrade with carrier board | Plus | $499 |
| | | | | |
| MacPeak Systems | Plus-RAM | 2MB upgrade | Plus, SE | $895 |
| | | | | |
| MacProducts USA | 2MB Expansion Board | 2MB upgrade | 128K | $175 |
| MacProducts USA | Magic Memory | 512K upgrade | 128K | $115 |
| MacProducts USA | Magic Memory | 1MB upgrade | 128K | $249 |
| MacProducts USA | Magic Memory | 2MB upgrade | 128K | $599 |
| MacProducts USA | Magic Memory | 4MB upgrade | 128K | $1150 |
| MacProducts USA | Magic Memory | 1MB upgrade | 512K, 512KE | $249 |
| MacProducts USA | Magic Memory | 2MB upgrade | 512K, 512KE | $599 |
| MacProducts USA | Magic Memory | 4MB upgrade | 512K, 512KE | $1150 |
| MacProducts USA | Magic 1MB SIMMs | 1MB SIMMs, sold in pairs only | Plus, SE | $219 |
| | | | | |
| Mass Micro | Mass Pak | 2MB upgrade | SE | $475 |
| Mass Micro | Mass Plus | 2MB upgrade | Plus | $349 |
| | | | | |
| Microtech Peripherals | Microtech Memory Kit | 2.5MB upgrade | Plus, SE | $599 |
| Microtech Peripherals | Microtech Memory Kit | 4MB upgrade | Plus, SE | $1159 |
| | | | | |
| OpenMac Enterprises | RamPlus 2 | 2MB upgrade with carrier board | Plus | $349 |
| OpenMac Enterprises | RamPlus 4 | 4MB upgrade with carrier board | Plus | $849 |
| OpenMac Enterprises | Ram II | 2MB upgrade | Plus, SE | $599 |
| OpenMac Enterprises | Ram II + II | 4MB upgrade | Plus, SE | $999 |
| | | | | |
| Spectra Micro Development | 2 1MB SIMMs | 2MB upgrade | Plus, SE | $498 |
| | | | | |
| Total Systems Integration | Dove 115 | 1MB upgrade | 128K | $449 |
| Total Systems Integration | TSI-206S | 1MB surface-mount SIMM | Plus, SE | $239 |
| Total Systems Integration | Dove 524O | 1MB upgrade | 512K | $269 |
| Total Systems Integration | Dove 524E | 1MB upgrade | 512KE | $239 |
| Total Systems Integration | Dove 524S | 1MB upgrade with SCSI interface | 512KE | $339 |
| Total Systems Integration | Dove 548O | 2MB upgrade | 512K | $629 |
| Total Systems Integration | Dove 548E | 2MB upgrade | 512KE | $599 |
| Total Systems Integration | Dove 548S | 2MB upgrade with SCSI interface | 512KE | $699 |
| Total Systems Integration | Dove 548H | 2MB upgrade, HyperDrive compatible | 512KE | $749 |
| Total Systems Integration | Plus 2 | 2MB nonexpandable upgrade | Plus | $449 |
| Total Systems Integration | Plus 2H | 2MB to 4MB upgrade with 1-megabit CMOS chips | Plus | $749 |
| Total Systems Integration | Plus 2S | 2MB to 4MB SIMM upgrade | Plus, SE | $749 |
| Total Systems Integration | Plus 4H | 4MB upgrade with 1-megabit CMOS chips | Plus | $1495 |
| Total Systems Integration | Plus 4S | 4MB upgrade with 1MB CMOS SIMMs | Plus, SE | $1495 |

# The Cost of Upgrading




*This chart compares selected options for upgrading the different Mac models. Start on the left with the Mac you own and follow the upgrade bar that ends at the approximate performance level you want. The labels along the top of the chart mark the general Mac-model performance equivalence you can expect after adding the upgrades shown. Compare the total upgrade cost on the right to the price of your target machine. (Note that the total cost includes the original price of your Mac model at the time of its introduction.) Keep in mind that such factors as ROM versions, color, and expandability will play as much a part as price in your decision to upgrade.*

*Mac SE system price includes two floppy drives and keyboard. Mac II system price includes one floppy drive and keyboard.

must have a fan (and sometimes an additional power supply) for a 128K, 512K, 512KE, or Mac Plus equipped with an accelerator. Some vendors include these extras with your board; if not, ask the vendor for recommendations of fans and power supplies.

**Do It Yourself**

Another question you must resolve when upgrading your Mac is whether or not to install the upgrade yourself. It really depends on the product–and on you. If you're apprehensive about it, don't do it yourself. Take it to a dealer.

*Check whether your upgrade violates the Apple warranty for your Mac. Any user-installed upgrade violates the warranty. Period.*

Levco says that all of its products can easily be installed by users. MacAdvance bills its MacGusto upgrade strictly as a user kit–only for users to install. On the other hand, SuperMac Technology, which now sells Levco's One Plus One and Prodigy SE, only allows dealer installation. In some cases, companies ask that you remove the Mac's system board and ship it to them for memory installation. Of course, your Mac is out of commission for as long as that board is out of it. Luckily, several companies do offer two-day turnarounds for an extra charge.

Most SCSI upgrades are billed as user-installable. If you do plan on doing these yourself, John Sawyer of CJS Systems gives this advice: examine the position and location of the ROMs very carefully. That's because some upgrades do ask you to pull the ROMs out and plug them into the sockets on the SCSI board. Apple didn't label the two ROMs (Hi and Low) until recently. Swapping the Hi and Low ROMs won't cause permanent damage, but if you plug the chips in backward, you'll fry your Mac.

You can choose from two types of accelerators, clip-on and plug-in. Of course, SE boards all plug into the SE's expansion slot. Since the Mac 128K, 512K, 512KE, and Mac Plus don't have expansion slots, you have to get a clip-on board.

Novy Systems recommends soldering its clip-on accelerator to the microprocessor (a service it provides free of charge at its factory) because it prevents oxidation of the 68000 pins. If the clip is not soldered to the 68000, it may require frequent cleaning to provide reliable operation.

**Watch Your Warranty**

Warranties are especially tricky for memory upgrades. For example, you can buy Dove's memory enhancements from several mail-order companies. However, Dove won't warrant user-installed upgrades. Check with your mail-order vendor about warranties for Dove products.

Third-party memory upgrade warranties usually range from one year to life. The shortest warranty–a scant 90 days–is that on SIMM upgrades from Apple.

While you're thinking about warranties, it's also a good idea to check if your upgrade violates the Apple warranty for your Mac. If the upgrade complies with the Apple warranty, you may save time and money on Apple dealer repairs.

Any user-installed upgrade violates the Apple warranty. Period.

Apple requires that installation of an upgrade not modify the design of the Mac. According to an Apple spokesperson, "modifying the design" means actually altering the system board of the Mac. Simple clip-on upgrades generally do not void the Apple warranty. The upgrade must satisfy physical, thermal, and electronic specifications supplied by Apple. Since Apple doesn't keep track of these things, you must ask your vendor for compliance information on the product.

If you go to a dealer, the technician doing the upgrade must be certified as an Apple service technician. This doesn't mean that a SuperMac dealer can't install a SuperMac product; it just says that the dealer must have an Apple-certified technician doing the work.

**Is It Worth It?**

With all the technical questions, there's always another thing to consider: is the upgrade worth it? Or should you just buy a new Mac?

John Foley, executive vice president of MacMemory, says that MacMemory recommends that 128K owners sell their machines and buy an SE. He claims that the cost of upgrading the 128K to a Plus, adding an accelerator board for extra performance, and adding an extra 1MB of memory (necessary to run many programs) is greater than the cost of just buying a new SE (see "The Cost of Upgrading").

Just to put a perspective on the buy-or-upgrade debate, the current retail price of a Mac SE (with regular keyboard and two internal floppy disk drives) is $2898; the list price of a Mac II (with regular keyboard) is $3898.

Upgrading your Mac isn't hard to do–but it isn't easy. With so many enhancements available, you've got to think seriously about what you need now, and what you will need. If you evaluate carefully, you'll save money–and headaches. □

See *Where to Buy* for product details.

MICK WIGGINS

# Live and in Color

## *An introduction to the primary elements of color paint programs*

**by Erfert Nielson**

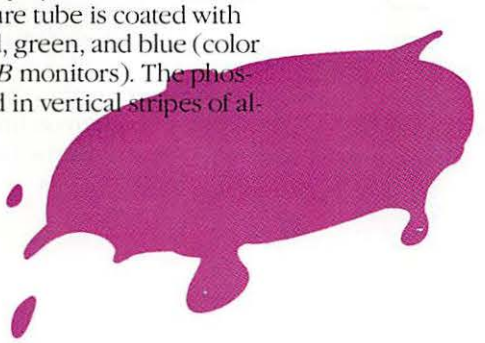
When I first saw color on the Mac's screen, I knew how Dorothy must have felt when she woke up in Oz. The Mac is definitely not in Kansas anymore. Dorothy's ticket to Technicolor was a bump on the head; yours is a color paint program. The following introduction to color graphics, which includes a preview of two paint programs, should help you make informed decisions about choosing and using a color application.

At this time, two Macintosh color paint programs exist: Computer Friends' *Modern Artist* and SuperMac Technology's forthcoming *PixelPaint.* Computer Friends' program is actually a Mac II incarnation of *ChromaPaint,* the color paint software included with the company's SuperChroma system. (To accommodate those who couldn't wait for the Mac II, SuperChroma allowed owners of 512Ks and other early Macs to attach a color monitor to their machines.) The two programs differ in approach–and price. For $149, *Modern Artist* offers a basic set of tools and a number of special effects. At the other end of the spectrum is *PixelPaint,* which sells for $495 but provides an incredible array of tool variations and effects (the Brush menu alone has 16 options). We'll use these two programs to see how colors are mixed and to look at some of the many tools and techniques available in color paint applications. First, let's look at how colors are created on the Mac II's monitor.

### Painted Pixels

The Mac II, a video card, and a color monitor team up with software to make color graphics possible. How does a monitor display colors? The inside surface of the monitor's picture tube is coated with three colors of phosphor: red, green, and blue (color monitors are often called *RGB* monitors). The phosphor coating can be arranged in vertical stripes of alternating colors or in red-green-blue triads. Either way, each *pixel* (picture element) on the screen contains a tiny cluster of the three colors. Inside the monitor, three electron guns (Sony color monitors use a single gun) sweep horizontally across the screen, one line at a time, zapping their respective colors in each pixel at varying voltages as instructed by the software. The three dots or stripes of color in each pixel are too small to be seen individually; the eye blends them into a single perceived color. (For more information on the workings of color monitors, see "Chasing Rainbows," *Macworld,* July 1987.)

Red, green, and blue are known as *primary colors,* because they can't be produced by mixing any other colors. "But wait a minute!" you say. "Red and blue are primaries, but green is produced by mixing blue and yellow." True enough, if you're mixing paint. But computers use *additive colors,* which are produced with light. The color theory that most of us learned in school is based on *subtractive colors,* or those reflected from a surface. With additive color mixing, the primary colors red, green, and blue can be combined to produce almost any color. With subtractive colors, such as those printed in books or magazines, the primary pigments blue (cyan), yellow, and red (magenta) are mixed to produce a full range of colors. Mixing equal amounts of additive primaries produces white, while mixing equal amounts of subtractive primaries produces black (or at least a dark color approximating black). Figure 1 should help clarify the difference between additive and subtractive color mixing.



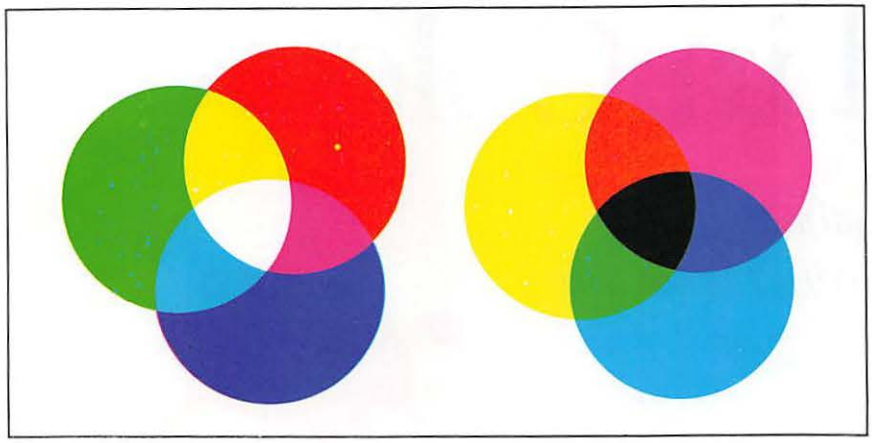


***Figure 1***
*Combining the three primaries in an additive (light) color system produces white, while combining the primaries in a subtractive (pigment) system results in black.*

### Color Lookup

The Mac II is currently capable of displaying 256 colors at a time. Where does this number come from? Anyone who is familiar with *MacPaint* or a similar black-and-white paint program knows that any given pixel can be either black or white. Shades of gray are produced with patterns of black pixels and white pixels. In this *1-bit* system, each pixel contains 1 bit (a binary digit) of information: 1 for on or 0 for off. (In the computer's binary numbering system, $2^1 = 2$ color possibilities.) The Mac II's video card allows each pixel to contain 8 bits of information ($2^8 = 256$ color possibilities). When you look at *PixelPaint*'s palette, you'll see a grid of 256 squares, each filled with a different color.

Computer artists are not limited to 256 colors, however, but to 256 colors *at once*. Color paint programs access a matrix of information in video RAM called a *color lookup table*. Each entry in the table contains a 24-bit number; $2^{24}$ results in more than 16 million possible colors (16,777,216 according to my Calculator desk accessory; in analog terms, this would equal enough Crayola crayons, laid end-to-end, to stretch from Denver to Las Vegas). Although 256 colors will meet the needs of many computer artists, even this number is inadequate for graphics that strive toward photographic realism or airbrush-smooth color gradations. *Color banding,* visible transitions within color regions that should blend smoothly, is common in 256-color systems. For smooth transitions from one color to another, more bits are required, although *Modern Artist*'s Random Dither Option alleviates the problem somewhat, offering nearly 6 million virtual, or perceived, colors to improve blending. In addition, 24-bit video cards that will display all 16 million colors at once are in the works. Most users won't feel compelled to save up for one, however. Besides, 256 colors will suffice for many graphic arts applications.

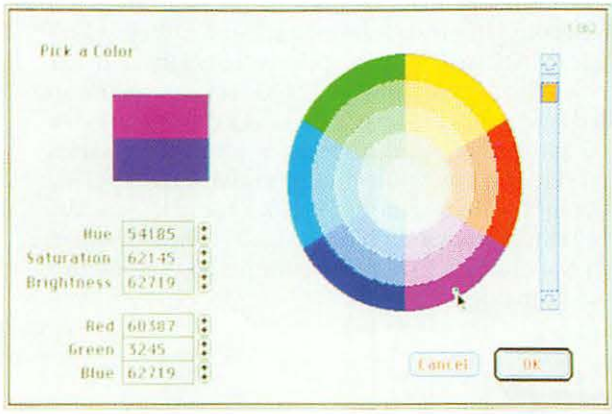



***Figure 2***
*To change colors,* PixelPaint *directly accesses Apple's Color Picker. The Color Picker provides graphic and numeric information about a color's hue, saturation, and value, presenting immediate feedback as colors are adjusted.*

### Mix It Up

Even if the discussion so far has you mixed up, there's no reason you can't mix up some colors on the Mac. *PixelPaint* and *Modern Artist* take similar approaches to the *color palette*–the selection of colors used in a painting. *PixelPaint*'s palette displays 256 colors, while *Modern Artist*'s displays 92. (To create the appearance of additional colors, *Modern Artist* employs a technique called *dithering,* mixing pixels of various colors and densities into clusters that the eye perceives as different colors.)

With only three primary colors per pixel, how can 16 million colors be created? Additive color mixing involves three components: hue, value, and saturation, each of which can be adjusted. *Hue* is the primary color, or a secondary color created by mixing primaries (red, blue, yellow, and purple are examples of hues). *Value,* also called *brightness* or *luminance,* is the lightness or darkness of a color from white to black. *Saturation,* also called *chroma* or *intensity,* refers to the purity of a color–its brightness or dullness. Pure hues are made less intense by adding either gray or the *complement* of the hue–the color opposite the hue on a color wheel.

*PixelPaint* and *Modern Artist* use similar color editors to represent the three components: hue, value, and saturation. Each program displays a *color wheel*–a circle made up of six hues. In *PixelPaint* the circle is divided into six wedges; *Modern Artist*'s circle displays a band of hues around its circumference. *PixelPaint*'s wedges of color become progressively grayer toward the center of the circle, representing changes in saturation from a pure hue to a shade of gray containing only a trace of the hue. Both programs represent value with a scroll bar; move the slider up to add white to a color and down to add black (see Figure 2).

A small dot within the circle represents the current color's position on the color wheel. The color itself appears in a nearby box and changes dynamically

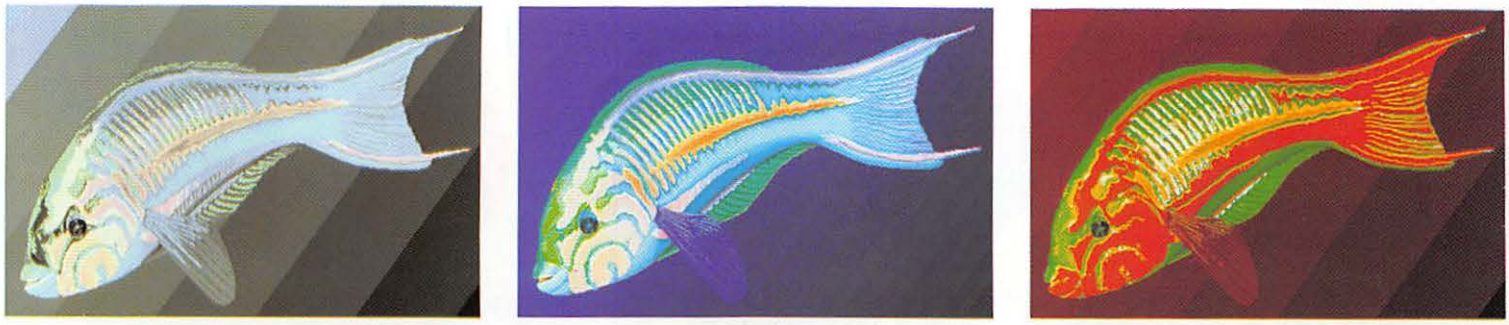


***Figure 3***
*Altering the color palette allows you to try different color schemes without changing the picture itself. Shown here are three variations on a* PixelPaint *picture.*

as you adjust hue, value, and saturation. You can alter a color in a number of ways. As an example, let's modify the bright red that occurs in *PixelPaint*'s default palette. When you select that color and open the color editor, the dot representing the color is in the red wedge of the color wheel (indicating that red is the hue) near the outer edge (this location shows the color's saturation–it contains little or no gray). The scroll box is at the top of the value scroll bar, indicating that the color has the maximum amount of luminance, or light. Say you want to change the red to a burnt orange. First, drag the dot around the circle toward the yellow hue, adding yellow to the red to produce a bright orange. Next, drag the dot toward the center of the circle, making the orange less intense. Finally, you might want to make the color darker by moving the scroll box down, subtracting some white.

Note that as you move the dot or the slider, numbers change in the boxes labeled Red, Green, and Blue. These numbers represent the color-lookup-table value for each primary in the color you're creating. You can also change a color by typing numbers into these boxes. While most people won't need these numerical values, some users might want to jot them down to quickly reproduce a particular color in a subsequent palette.

Adjust the color until you're satisfied. When you create the color you're looking for, you can save it in a custom palette. Both programs let you save as many palettes as you like, allowing you to choose the one that suits your current painting.

The ability to modify the palette is one of a color paint program's most powerful features. Suppose you've just completed a landscape in the pointillist style. It looks fine on the screen, but when it's output on a thermal printer the purple looks too dark. You can't possibly go into the painting and change every occurrence of that particular shade of purple. You can, however, select the imperfect color, alter it in the palette, and voilà–every pixel of the selected color changes to the new color.

You can achieve dramatic effects by altering a picture's palette, which in turn modifies the color lookup table. If you don't like a modified color, you can change it again and again until you get it right. Color controls in *PixelPaint* let you specify Warmer (add red) or Cooler (add blue) or automatically select a color's complement. To see the effect of altering a color palette, open a picture in *PixelPaint* or *Modern Artist* and select different palettes, noting the changes in color harmony that each produces (see Figure 3).

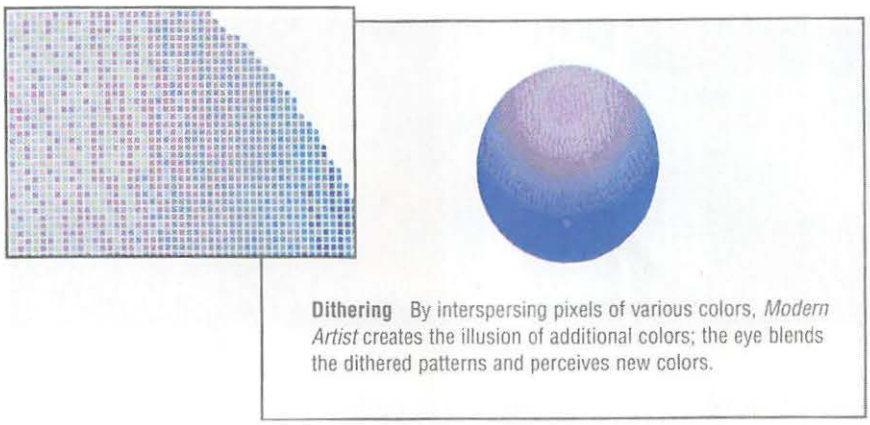
### Tools of the Trade

Someone once remarked to me that he couldn't understand why several color paint programs weren't available the minute the first Mac II rolled off the assembly line. All that developers had to do was add a color palette to *MacPaint,* right? Wrong. In addition to dealing with the intricacies of a color palette, *Modern Artist* and *PixelPaint* add tools and effects that far surpass anything a mere "color *MacPaint*" could do.

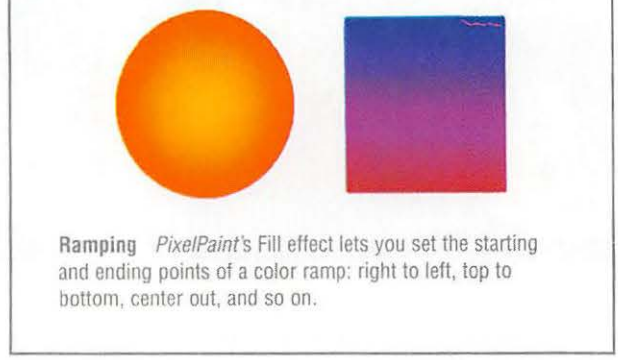
Many artists will no doubt use color paint programs to add color to black-and-white illustrations done in *MacPaint, FullPaint,* or *SuperPaint.* The simplest method is to transfer the drawing to the color paint program via the Scrapbook and add colors to black areas with the paint bucket. Simple, but not elegant–better methods exist. For example, both programs let you apply a colored wash to a drawing, adding color to the white background but not to the black lines of the illustration. This is known as a Minimum effect. *PixelPaint* also offers a Maximum effect, which fills black areas with a color but leaves white areas untouched. The Tint option in *PixelPaint* works in a similar manner with gray-scale images, adding color to gray areas as in a hand-tinted photo.

If you're trying to achieve realism in a color painting, several special effects can assist you. For example, *PixelPaint*'s Smooth option softens the jagged edges common to images made up of pixels. This stair-step effect is often called *jaggies* but is also known as *aliasing.* The Smooth command performs *antialiasing,* a technique that places pixels of intermediate values between neighboring pixels to blur edges.

Another way to add realism to computer graphics is to add texture to surfaces. Both programs let you edit patterns to produce any number of textured ef-



**Dithering** By interspersing pixels of various colors, *Modern Artist* creates the illusion of additional colors; the eye blends the dithered patterns and perceives new colors.

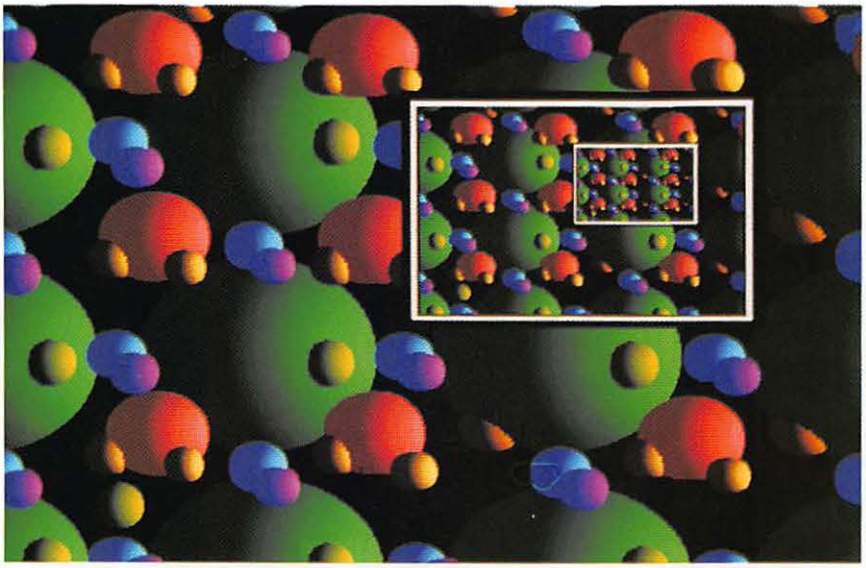


**Ramping** *PixelPaint*'s Fill effect lets you set the starting and ending points of a color ramp: right to left, top to bottom, center out, and so on.

fects. In addition, each has a spray-can tool that spatters random patterns of pixels of any color over an area, adding texture to flat surfaces.

Yet another key to realism is simulating light and shadow, creating the illusion of a three-dimensional scene. *Modern Artist* offers automatic 3-D effects, shading the edges of spheres and even allowing you to set a "light source." *PixelPaint* provides Lighten and Darken options, which lay down random patterns of white and black pixels, respectively, allowing you to add light and shadow.

Of course, not everyone is interested in replicating reality. Some artists prefer to focus on the unique capabilities of the computer as a graphics tool. Color paint programs accommodate both the landscape painter and the digital-graphics artist. The latter might be interested in such special effects as color *ramping*, in which the program calculates and displays a smooth transition of shades from one selected color to another. Both programs offer this feature.



***Modern Artist***
*This image of molecules was created by Richard Crandall of Reed College, with* Modern Artist. *He used the 3-D shaded sphere tool and a light source. The Chinese-box effect was accomplished by copying the image, resizing it, and pasting it on top of the original.*

Special effects abound in *PixelPaint*. The Shadow effect duplicates an object in gray as you draw it; the angle and distance of the shadow from the original object are adjustable. Another notable effect is the Tile option, which lets you create a repeating pattern out of a rectangular portion of a drawing.

### Color Considerations

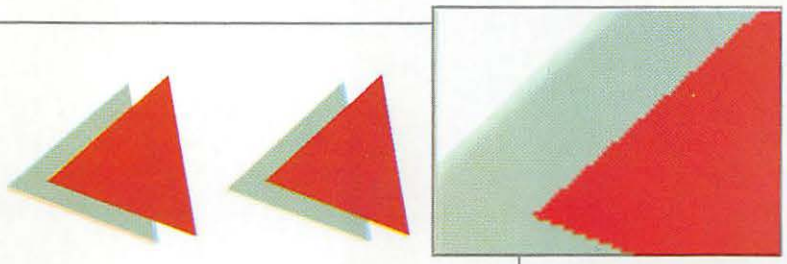
A new set of practical and aesthetic considerations comes into play when you switch from black-and-white to color. For example, colors often interact with one another to produce unforeseen results. Try the following experiment. Draw a large black rectangle and a bright yellow rectangle of the same size, and place them side by side on the screen. Choose a third color—say, bright red—and place a small rectangle of that color on each of the background colors. Although you know both small rectangles are the same hue, your eye is fooled into perceiving them as two radically different shades of red.

Psychological factors affect color perception as well. A certain color combination can mean different things to different audiences. For example, red and green may connote Christmas to some people, represent a national flag to others, and create no associations at all for another group.

Many people who are new to color graphics overdo the use of color at first, simply because it's a novelty. If you're trying to make a point with a color sales chart and use twelve different colors to indicate different variables, you'll end up confusing your audience rather than enlightening it.

These are only a few of the factors to keep in mind when creating color graphics. If you're an artist or designer, you already understand color theory; if you're new to color graphics, consider reading an introductory book on computer graphics or traditional painting.

**3-D** *Modern Artist* allows you to set the position of a light source, which automatically shades objects to create a three-dimensional look.



**Antialiasing** Select the Smooth option with *PixelPaint*'s brush to soften jagged edges, as shown in the shadow on the right.

### The Money of Color

Once you've chosen a color video card and monitor for your Mac II, you'll have to decide which color paint program suits your needs. More contenders may have appeared by the time you read this, but choosing between *Modern Artist* and *PixelPaint* is fairly straightforward. If you have a limited budget and want a basic set of color tools and special effects, *Modern Artist* should do the trick. (If you're interested in the emerging field of desktop video, you should note that Computer Friends offers a $599 genlock card that makes the Mac II's standard video card compatible with NTSC video signals, allowing you to overlay *Modern Artist* illustrations on live TV or video.) If you're willing to spend more, *PixelPaint* is loaded with options, as they say in the car-analogy biz. *PixelPaint* has more bells, whistles, and brushes than most artists will ever need–and the program is packaged in an easy-to-understand user interface that's a masterpiece in its own right.

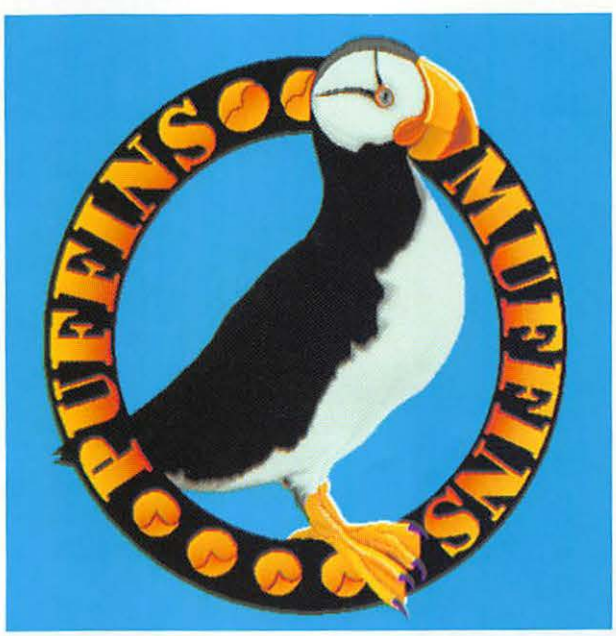
While you're spending money, how about a color output device? Several color thermal printers are available, including Hewlett-Packard's PaintJet, the Shinko Color Printer CHC-335, CalComp Plotmaster, the JDL 850 GL+, and the Seiko D-Scan. Computer Friends markets the Shinko CHC-335, a 200-dpi thermal printer. Unfortunately, current color thermal printers don't do justice to the graphics produced with color paint programs; 200 dpi is a fairly coarse resolution, and the printed colors pale in comparison to their counterparts on the screen. Furthermore, printed color output can't be distributed easily to even small groups of people because it can't be photocopied; each person requires an individual printout.

Film recorders, while more expensive than thermal printers, offer superior resolution capable of producing highly detailed images while retaining the brightness of the original colors. Although film recorders cannot directly produce printed output, they can create slides. The slides can be projected during presentations or used to produce color film for use in traditional four-color printing.

I prefer another viewing option myself–the monitor. Granted, for applications like presentations or reports, color output is mandatory. But for viewing a work of art, you can't beat the fidelity of the screen on which it was painted. The computer/paint-program combination is, after all, an artistic medium; most people watch TV or movies without hankering for still photos of their favorite scenes, so why not view computer-generated art on the computer?

Now that you know some of the principles of computer-based color, you won't be intimidated by dialog boxes full of wheels, sliders, and unfamiliar terms. But nothing beats experience. I recommend spilling a few pixels of paint on your smock and trying out a color paint program. □

See *Where to Buy* for product details.




***PixelPaint***
*This advertisement takes advantage of* PixelPaint*'s color-blending capabilities. The light-blue background gradually darkens from the center of the circle outward, and the logo's letters flow from yellow to orange. The program's Smooth command was used to soften the border between the puffin's black and white feathers.*

*by Michael Bayles and Melanie Bayles*

Word processing was one of the first microcomputer applications, and it remains the most popular. This is partly because preparing documents is one of the things computers do really well and partly because writing is something virtually everyone does.

Some people need a word processor only once in a while and for simple jobs. When Apple shipped *MacWrite* free with the Mac, such people never had to worry about buying a special program. Today they still don't have to worry about it much. There are only three or four basic-model programs, and all of them will do the job. Choosing is a matter of balancing a few criteria and, if possible, sitting down for a try-out and seeing which program feels best.

For many of us, however, processing words is a big part of what we do. Leaving aside the obvious examples like writers or teachers, business and professional people of all kinds have a constant need to prepare reports, presentations, and other documents. For such people, selecting a word processor is like getting married. The choice is a complex one and, since the program will be a constant companion, critically important. Given enough time and exposure, even small irritations can grow into major gripes. To help you avoid an inappropriate match, this article profiles the major Macintosh word processing packages and details their strengths and weaknesses.

### The Basics: MacWrite and WriteNow

The advent of the Macintosh as a word processing tool has created new standards in this application area. Basic word processing software for the Mac includes the following features: cut and paste (including text and graphics); automatic word wrap; the ability to use all typefaces, styles, and sizes in the System file; sup-

# Just Write

## *Find the right writing tool*

port for ImageWriter and LaserWriter printers; the ability to read and write text-only files; variable page margins; and a left-tab function (text aligned to the right of the tab setting).

All of the word processing packages covered here perform these minimal functions well. So if you're choosing a word processor, you must base your selection on other criteria. For a basic program, some of these are:

**Ease of use** If you don't need complex features, simplicity will be an advantage. *Microsoft Works, MacWrite, Microsoft Write,* and *WriteNow* offer very simple and forthright user interfaces. Most users will quickly feel comfortable with these applications.

**Size** Those of you who use the 128K Macintosh or who have 400K drives or only one 800K drive should be concerned about the disk space a word processor occupies. The top contenders for efficient use of disk space are *MacWrite* and *WriteNow.* Both use less than 80K and have a full complement of features. *WriteNow* is the only application discussed in this article that is still designed to operate on a 128K Macintosh. Even the congenial *MacWrite* now requires a minimum of 512K.

**Features** The latest version of *MacWrite* is virtually the same program that shipped with the original 128K Macintosh in 1984. The *MacWrite* file format is a standard used for a great many of the files found on information services and for disk-based documentation. However, *WriteNow* offers a number of features that make it an attractive replacement for *MacWrite:*

- A document translator. This application converts *MacWrite* (versions 4.5 and earlier) and *Microsoft Word* (version 1.05) documents to *WriteNow* files. The translator also converts *WriteNow* files to a text-only format.
- A 50,000-word spelling checker. While 50,000 entries is bare-bones, you can customize the dictionary with your own words. If you want to use the spelling checker, add another 107K to the disk space requirement.
- Automatic footnotes. Insert footnotes anywhere in the document; *WriteNow* automatically numbers them and positions them at the bottom of the page.
- Multiple-column format. Up to four evenly spaced columns of text may appear and be edited directly on the screen.
- Multiple headers and footers. You can place as many headers and footers as you need in a document. Odd and even pages can bear different headers and/or footers.

As you may have noted, *WriteNow* transcends the requirements of basic word processing. However, while *WriteNow* has a complete range of functions, each is somewhat limited. If you need a lot of flexibility in formatting your document, *WriteNow* may not be able to provide it.

T/Maker makes it easy to test-drive *WriteNow.* Just ask a dealer or a friend who owns the program for a copy of *Sample WriteNow* (included with every copy of *WriteNow*). The sample copy is fully functional but puts a message on each printed page stating that the document was created using *Sample WriteNow.*

### Son of Word: Microsoft Write

*Microsoft Write* is a new contender in the basic word processing wars. This product is a stripped-down version of *Microsoft Word,* designed for personal use. The glossaries, the automatic table of contents and index generation, the outliner, and the style sheets are all gone. But *MS Write* provides basic word processing

PHOTOGRAPH BY ELISABET ZEILON

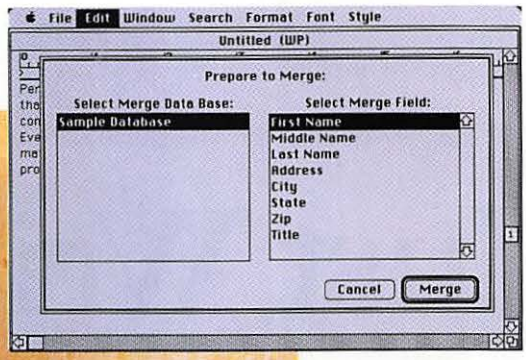



***Figure 1***
*Establishing a link from the database to the word processor in* Works *is as simple as selecting a field name from this dialog box.*

functions while maintaining a command and file structure compatible with its parent, *Word.*

*MS Write* is a much larger program than either *WriteNow* or *MacWrite.* It weighs in at a hefty 287K–plus 162K for the 80,000-word dictionary and another 67K for the help file (516K total). You probably won't feel comfortable running *MS Write* on a system without two 800K drives. In fact, as with all Microsoft products, *MS Write* is shipped on 800K disks.

*MS Write* provides some features not found in *WriteNow* or *MacWrite. MS Write* provides a comprehensive online help file, mathematical typesetting comparable to that found in *Word,* the ability to read and write many file structures (including *Word* for both the Macintosh and IBM, *Microsoft Works,* and *MacWrite* text files), and elementary forms generation (vertical and horizontal lines). As with *Word,* graphics may be included in a line of text, and individual columns of data may be moved independently of other columns.

Microsoft maintains that most users will opt for the full power (and price) of its flagship word processor, *Word.* If you aren't certain that you need *Word,* however, *MS Write* is available at a lower price, with a guaranteed upgrade price (the difference in cost between *MS Write* and *Word*) should you ever desire to make the change. Since the commands and files for the two programs are compatible, upgrading is relatively painless.

Microsoft has designed and priced *MS Write* to compete directly with *WriteNow.* In general, the only reason to go with *MS Write* is if you particularly need any of its special features–equation setting, special file formats, or multiple windows–or if you anticipate that your word processing needs are liable to grow beyond the basic stage. *WriteNow,* with its interactive page breaks (as opposed to *Word*'s awkward page-break scheme), is probably a friendlier tool, and it takes up much less disk space (79K versus 287K).

### A Basic for Business: Microsoft Works

*Microsoft Works* is the fourth application that qualifies as a basic word processor. *Works,* however, is an altogether different breed of software than *MacWrite, MS Write,* or *WriteNow.* It's an integrated package that combines database, spreadsheet, and communications functions with basic word processing.

The word processing module in *Works* is similar to *MacWrite* in many ways and is equally simple to use. *Works'* advantage over other word processors is that it can put database information into text documents in one move. Anyone who has struggled with text files of names and addresses can appreciate the approach used to link a word processing document to a database in *Works* (see Figure 1).

*Works* also lets you draw simple line graphics (lines, boxes, circles, ovals) in your document. These graphics are handy for generating forms and embellishing text. *Works'* line graphics don't "float" with the text, however–a problem when you have to edit your documents.

One *Works* feature that's not nearly as complete or convenient as the same function in other basic word processors is headers and footers. You can specify what information will appear at the top or bottom of each page, but the information must be the same for the entire document. And you must enter arcane codes, such as *&C* for centering.

### Advanced Word Processing

Most of the true innovation in word processing software recently has taken place in products designed for the professional or business writer. This software is high-priced, heavy on features, and more difficult to learn than basic packages.

Because professional writing is often highly structured, advanced word processors provide features that eliminate much of the drudgery associated with creating complex documents. Mechanization of repetitive tasks is one of the main methods for increasing writers' efficiency. For example, advanced word processors often have features for producing tables of contents, indexes, and glossaries automatically from text. The writer inserts a code or assigns a heading type to a section of text that is to be included in a list. To produce the list, the author issues a command, and the word processing software collects all the references and their locations and saves this information.

Another portion of the writing process that is becoming more mechanized is document formatting. Early word processors such as *MacWrite* made it difficult to assign the same formats to nonadjacent text. It

was also difficult to use formats from previous documents without actually copying the document and then replacing the existing text with new text.

Advanced word processors address these problems by allowing you to create *styles* that contain the information necessary to describe a format for a given type of text element or document (such as typeface size and style, tab and margin settings, and justification). Once you've defined and named a style, you format each element by simply selecting its name from a style menu. If you need to change the format of a particular level of head or type of paragraph, you edit the style, and the word processing software automatically makes changes throughout the document.

While automatic formats are very useful, the creators of advanced word processors have complicated the issue by providing a wide variety of new options like variable column formats on a single page, strikethrough characters, kerning (control over character spacing in a word), double underlining, solid underlining, dotted underlining, and automatic rule placement. You can even choose from different types of multiple columns: top-to-bottom, continuing columns ("snake" format), or side-by-side columns useful for, say, scripts.

Advanced word processors also incorporate other aids such as outlining programs, automatic hyphenation, improved spelling checkers with thesaurus functions, and glossaries. (With a glossary, you type a complex name or phrase and its formatting once, assign a code to the phrase, and copy the phrase into the glossary. When you need that phrase in a document, just type the code, and the word processor automatically expands the abbreviation.)

It's difficult to say which advanced word processing features you should have. One thing everyone should consider, however, is file compatibility. Your word processor has to function in the real world. If you work with other people, the ability to read and write a variety of formats will save you work and time.

The major professional word processors on the market when we wrote this were *Microsoft Word* (version 3.01), *MindWrite* (version 1.1), and *Laser Author.* By the time you read this, you may be able to buy three more programs: *FullWrite Professional,* from Ann Arbor Softworks; Paragon Concepts' *InAWord* (a descendant of the Macintosh macro editor *QUED/M*); and *WordPerfect,* from the manufacturer of the same name. These three programs are discussed in the accompanying sidebars.

Although all the new programs' manufacturers claim their products will be out soon, we couldn't get even a beta copy of two of them. We did, however, get

## FullWrite—We're Ready for It

*FullWrite Professional* has been eagerly awaited since its announcement over a year ago. Demonstration copies have attracted great interest from the Macintosh community because of the innovative methods used to integrate complex features. Unfortunately, even though Ann Arbor is promising to release this program soon, all we could look at was a copy of the beta manual.

According to the documentation, *FullWrite* is an advanced word processing package. It supports mail merge for printing form letters and has a full array of outline commands. You can assign names, known as Variables, to text and graphics and use them like glossary entries. Unlike with a glossary, however, later changes in the graphics or text strings will be reflected wherever the variables have been used in the document. Paragraph sorting, kerning, glossaries, and spelling-checking with thesaurus are also offered.

*FullWrite* uses an icon bar along the left margin of the text to display information pertaining to that text. For example, if comments about the text exist, a posted-note icon appears in the bar. To see the note, click on the icon and the contents of the note appear in a separate window. Likewise, icons for information about footnotes, and codes for table of contents and index entries appear in the icon bar. When text is moved, the icons float with the text. This approach allows you to see complex formatting information without interrupting the body of the text.

One feature that will be appreciated is a find-and-replace command that looks for text of a certain style, size, or justification. You can limit the search to whole words only and make it case-sensitive.

You may also create custom styles that are similar in concept to *Microsoft Word*'s. However, *FullWrite* does not seem to have a method for easily transferring custom styles from one document to another without using the Clipboard. Another unique offering in this program is a complete set of *MacDraw*-type drawing tools.

*FullWrite*'s documentation looks impressive. One day we hope to be able to make a similar report regarding its software.

# Word Processors

| | Basic | | | | Advanced | | | |
|---|---|---|---|---|---|---|---|---|
| | MacWrite 4.5/4.6 | WriteNow | Microsoft Write[1] | Microsoft Works | Microsoft Word 3.01 | Laser Author | MindWrite | WordPerfect[1] |
| **Basic statistics** | | | | | | | | |
| Size of basic application | 78K | 79K | 287K | 327K | 350K | 276K | 272K | 275K |
| Size fully configured[2] | n/a | 258K | 516K | 396K | 648K | n/a | 314K | 913K |
| Memory required | 512K | 128K | 512K | 512K | 512K | 512K | 512K | 512KE |
| Retail price | $125 | $175 | $175 | $295 | $395 | $200 | $295 | $395 |
| Copy protected | | | | | | | | |
| **Characters/fonts** | | | | | | | | |
| Small caps | | | | | ● | ● | | |
| Strike-through | | | | | ● | ● | | ● |
| Superscript | | ● | ● | ● | ● | ● | ● | ● |
| Subscript | | ● | ● | ● | ● | ● | ● | ● |
| Extend | | ● | | | ● | ● | | ● |
| Condense | | ● | | | ● | ● | | ● |
| Change font size by points | | ● | | | ● | ● | | ● |
| Font sizes available | 9,10,12,14,18 | 9,10,12,14, 18,24,36,48 | 9,10,12, 14,18,24 | 9,10,12,14, 18,20,24 | 2-127 | 9,10,12 | 9,10,12,14, 18,24 | 1-127 |
| **Reads formats** | | | | | | | | |
| Text only | ● | ●[3] | ● | ● | ● | ● | ● | ● |
| MacWrite | ● | ●[3] | ● | ● | ● | | ● | ● |
| Microsoft Word | | ●[3] | current & 1.0 | current & 1.0 | current & 1.0 | | | |
| Others | | | Works, DOS Word, RTF, | | Works, DOS Word, RTF, | Acta, ThinkTank | ThinkTank | RTF, DCA, IBM WP 4.2 |
| **Writes formats** | | | | | | | | |
| Text only | ● | ●[3] | ●[4] | ● | ●[4] | ● | ● | ● |
| MacWrite | ● | | ● | | ● | | ● | |
| Microsoft Word | | | current & 1.0 | | current & 1.0 | | | |
| Others | | | RTF, DOS Word | | RTF, DOS Word | | | RTF, IBM WP 4.2 |
| **Pagination** | | | | | | | | |
| Page preview | | | ● | | ● | | | ● |
| Page breaks | dynamic | dynamic | manual | dynamic | manual | dynamic | dynamic | dynamic |
| Manual page breaks | ● | ● | ● | ● | ● | ● | ● | ● |
| **Rulers** | | | | | | | | |
| Picas, points, centimeters | | | | | ● | ● | | ● |
| Maximum size | 7 in. | 14 in. | 22 in. | 15 in. | 22 in. | 14 in. | 7 in. | 24 in. |
| **Scrolling** | | | | | | | | |
| Horizontal | | ● | ● | ● | ● | ● | | ● |
| Automatic | ● | var. speed | ● | ● | ● | ● | ● | ● |
| **Tabs** | | | | | | | | |
| Left | ● | ● | ● | ● | ● | ● | ● | ● |
| Right | ● | ● | ● | ● | ● | ● | | ● |
| Center | ● | ● | ● | | ● | ● | | ● |
| Decimal | ● | | ● | | ● | ● | ● | ● |
| **Windows** | | | | | | | | |
| Max. no. document windows | 1 | RAM limit | 16 | 1 | RAM limit | 4 | RAM limit | RAM limit |
| Multiple windows to a document | | | ● | | ● | | ● | |
| Split window | | | ● | | ● | | | |
| Zoom window | | ● | ● | ● | ● | ● | ● | ● |
| **Find/change** | | | | | | | | |
| Search selected block only | | | change only | | ● | | ● | |
| Tab/return | | ● | ● | | ● | ● | ● | ● |
| Wild card | | ● | | | ● | ● | ● | ● |
| Go to page | ● | ● | ● | ● | ● | ● | ● | ● |

| | Basic | | | | Advanced | | | |
|---|---|---|---|---|---|---|---|---|
| | MacWrite 4.5/4.6 | WriteNow | Microsoft Write[1] | Microsoft Works | Microsoft Word 3.01 | Laser Author | MindWrite | WordPerfect[1] |
| **Footnotes** | | | | | | | | |
| At end of page | | ● | ● | | ● | | | ● |
| At end of document | | | ● | | ● | | | ● |
| Automatic numbering | | ● | ● | | ● | | | ● |
| **Formatting** | | | | | | | | |
| Copy paragraph formats | ● | ● | ● | ● | ● | ● | ● | [5] |
| Alter default format | ● | ● | | ● | ● | ● | ● | ● |
| Style sheets | | | | | ● | ● | | [5] |
| Page number, time/date stamps | in headers/ footers | anywhere | in headers/ footers | in headers/ footers | anywhere | in headers/ footers | in headers/ footers | anywhere |
| Global change size/style | ● | ● | ● | ● | ● | ● | ● | ● |
| Change case | | | | | ●[6] | ● | | |
| **Graphics** | | | | | | | | |
| Import via Clipboard | ● | ● | ● | ● | ● | ● | ● | ● |
| Graphics tools | | | | ● | ● | | | |
| **Headers/footers** | | | | | | | | |
| Maximum size (% of page) | 33% | 25% | 100% | 1 line | 100% | 25% | 50% | 100% |
| Graphics in | ● | ● | ● | | ● | ● | ● | ● |
| First page only | | ● | | | ● | | ● | ● |
| Not on first page | ● | ● | ● | ● | ● | ● | ● | ● |
| Odd/even pages option | | ● | | | ● | ● | | ● |
| Multiple | | ● | | | ● | | | ● |
| **Hyphenation** | | | | | | | | |
| Manual soft | ● | ● | ● | | | ● | | |
| Automatic | | | | | ● | | | ● |
| Nonbreaking space | ● | ● | ● | ● | ● | ● | ● | ● |
| **Page makeup** | | | | | | | | |
| Kerning | | | | | ● | ● | | ● |
| Binding gutter | | ● | | | ● | ● | left only | ● |
| Maximum number columns | 1 | 4 | 4 | 1 | 100 | unlimited | 1 | 24 |
| Variable width | n/a | | | n/a | | ● | n/a | ● |
| Leading/line spacing | 1, 1.5, 2 | 1-99 pts. | 1, 1.5, 2 | 1, 1.5, 2 | 1-432 pts. | 0-255 pts. | 1, 1.5, 2 | 1-127 pts. |
| Increment | 0.5 line | 1 pt. | 0.5 line | 0.5 line | 0.5 pt. | 1 pt. | 0.5 line | 1 pt. |
| **Other features** | | | | | | | | |
| Spelling checker | | ● | ● | | ● | | | ● |
| Sorting | | | | | ● | | some | |
| Show nonprinting characters | | ● | ● | | ● | ● | | ● |
| Automatic table of contents | | | | | ● | | ● | ● |
| Automatic index | | | | | ● | | | ● |
| Mail merge | | | | ● | ● | | | ● |
| Math typesetting | | | ● | | ● | manual | | |
| Online help | | | ● | ● | ● | | ● | ● |
| Outlining | | | | | ● | | ● | ● |
| Glossary | | | | | ● | | | [5] |
| Automatic word count | | | | | | ● | ● | ● |

[1] Data based on prerelease software and subject to change.
[2] Includes spelling and hyphenation dictionaries, help files, translator utilities, or thesauri.
[3] Uses translator utility.
[4] Includes line breaks.
[5] Can be performed using macros.
[6] To/from all caps.

# From IBM to Mac: WordPerfect

*WordPerfect* has been a hugely successful word processing program for the IBM PC and has earned a reputation as one of the most flexible writing tools available. A new version of *WordPerfect* has been developed from the ground up for the Macintosh. While the retail version wasn't available as this article was being prepared, we did look at a good beta copy.

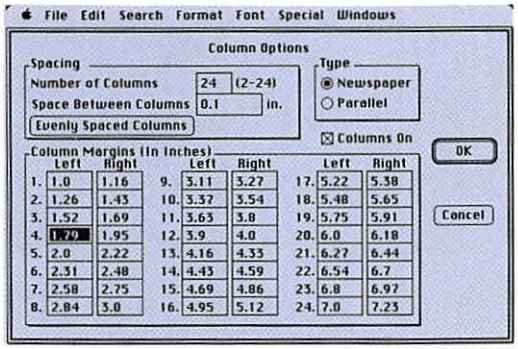
*WordPerfect* is another word processor with so many features that even the most inquisitive writers may never discover them all. The program's developers tried to make the huge number of commands manageable by providing hierarchical menus. When an arrow follows a menu option, selecting that item reveals a menu to the right of the original menu. In addition, almost all commands have keyboard equivalents.

The *WordPerfect* developers' experience in working with IBM's hierarchial file structure is apparent as you use *WordPerfect* for the Macintosh. Mac software developers seem to have forgotten that there's an urgent need for more file control and management functions from within applications. *WordPerfect* allows you to specify which disks and which folders are to hold work files, temporary files, the Speller/Thesaurus files, and macro files. (Yes, that is correct. *WordPerfect* supports macros.) You may also perform many other file and folder maintenance chores (copy, delete, move, rename, and create) from within *WordPerfect*.

*WordPerfect* introduces a unique method for handling codes for indexing, footnoting, and character formatting. You actually place these codes in the document, but they don't appear in the normal text display. When you need to see the codes, you split the window. The top half displays the formatted text, while the bottom half displays the text and the associated codes. The text of any footnotes appears between footnote codes in the bottom half of the window. The bottom and top of the window are linked so that when the insertion point is scrolled in one, the other window scrolls accordingly. You can edit all coding directly when you need to.

*WordPerfect*'s extensive formatting features break down the boundaries between word processors and page-layout software. For example, you may specify up to 24 columns of text on a single page. The screen displays the columns as they will print, and you can edit columns interactively.

The spelling checker that will ship as part of *WordPerfect* is fast and comes with a comprehensive thesaurus that lists synonyms and antonyms. In addition, the spelling checker offers spelling suggestions based on a knowledge of phonetics and common typos.




WordPerfect *enables you to create up to 24 individual columns on a single page. The columns can be equally spaced or the width of each column can be specified independently.*

a good, stable beta of *WordPerfect,* so we included information on that version in the "Word Processors" table (the *MS Write* figures also came from a late beta copy).

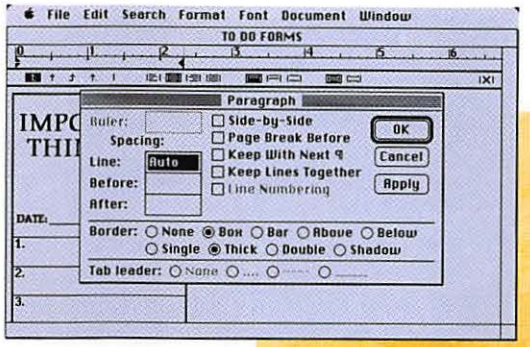
### Microsoft Word

*Microsoft Word* has more features than most people will probably ever need–or even discover. It is designed to meet the needs of all professional writers from the novelist working on a best-seller to the scientist seeking a Nobel-prize-winning discovery. It can even manage modest desktop publishing jobs. Because of its breadth of features, *Word* has earned a reputation for being difficult to learn.

*Microsoft Word* includes an outliner, style sheets, glossaries, spelling checker, automatic hyphenation, and myriad formatting aids. It also reads (and writes) a number of formats, including the MS-DOS *Word.* Unlike the previous release (3.00), all features tested work well in the current version. It is, as advertised, a professional, full-featured word processor.

One of the highlights of *Word* is the concept of customizable menus. Recognizing the complexity of its product, Microsoft has equipped *Word* with short menus for beginners and full menus for more advanced users. The short menus hide functions that might confuse or intimidate new users, in effect mak-

***Figure 2***
*Word's paragraph formats are very versatile; they can even include boxes and lines for forms generation and similar tasks.*




ing *Word* feel more like a basic word processor. As you grow more comfortable with the product, you can turn on the full menus.

In addition, once you have graduated to full menus, you can customize the Format and Font menus. If you normally need only three fonts in two sizes with only italic and bold styles, you can have just those options appear on the menus. All other options remain available through a dialog box if you need them.

In addition to being a very capable word processor, *Word* has the ability to generate forms and rules (basic line graphics) quickly and easily (see Figure 2). Lines, boxes, and text in *Word* all automatically line up and move together when text is added or deleted (unlike in *Works*).

*Word* also has a set of equation-typesetting commands. These commands automatically format complex equations (integrals, arrays, complex fractions, summations, roots of complex expressions). The drawback is that you have to learn a set of commands that bear little resemblance to the finished product (see Figure 3).

Microsoft has equipped *Word* to handle PostScript commands directly. You insert the PostScript commands in text and format them as hidden text and as PostScript. The commands are then sent to your LaserWriter (or other PostScript-driven printer) when the document is printed. This option allows you to access all of the LaserWriter's functions such as text rotation and complex shading or graphics.

$$\frac{1}{k} = \frac{\int_0^{\infty} \frac{1}{k^*(n)} \frac{dr(n)}{dT} \frac{dT}{dr} dn}{\int_0^{\infty} \frac{dr(n)}{dT} \frac{dT}{dr} dn} \qquad [4.3]$$

```
\F(1,k)=\F(\I(0,∞,\F(1,k\S\UP 2(*)(n)\S\UP
3(-))\F(dr(n),dT\S\UP 3(-))\F(dT,dr\S\UP
3(-))dn),\I(0,∞,\F(dr(n),dT\S\UP 3(-))\F(
dT,dr\S\UP 3(-))dn))                    [4.3]¶
```

***Figure 3***
Microsoft Word's *equation-setting function is effective, but it's a far cry from WYSIWYG. The screen on top shows an equation set in* Word; *the lower screen shows the coding necessary to achieve the same equation. This coding isn't as difficult as it looks, since* Word *calculates the spacing automatically.*

An added advantage for those who use *Microsoft Excel* is that information and graphics from *Excel* can be linked directly to a *Word* document. When you make changes in the original data in *Excel,* the linked *Word* document reflects those changes. (Note: if you use this option you must use *Switcher* and load *Excel* and *Word* at the same time. Count on needing a minimum of 1MB of memory and a hard disk.)

While Microsoft deserves accolades for bringing a complete word processing tool to market, it also deserves some criticism for *Word*'s complexity. *Word*'s features work well, but many are cumbersome to implement. For example, when creating an index with *Word*'s indexing function, you must include hidden codes and/or text in the body of the document at the point where the reference is made. Note that both *FullWrite* and *WordPerfect* offer other solutions to this problem.

Another un-Mac-like *Word* function–by far the program's most commonly criticized feature–is the way it handles page breaks. To see where a page ends, you must execute the Repaginate command. If you then add or delete text to your document, *Word* continues to show the page breaks, but they're wrong. Since the Repaginate command takes a few seconds per page every time you use it, placing elements on pages correctly can be a time-consuming process. *Word* is the only Macintosh word processor with nondynamic page breaks.

**MindWrite**

While *Microsoft Word* tries to provide for all the needs of professional writers, MindWork's *MindWrite* is directed more toward the creative end of the pro-

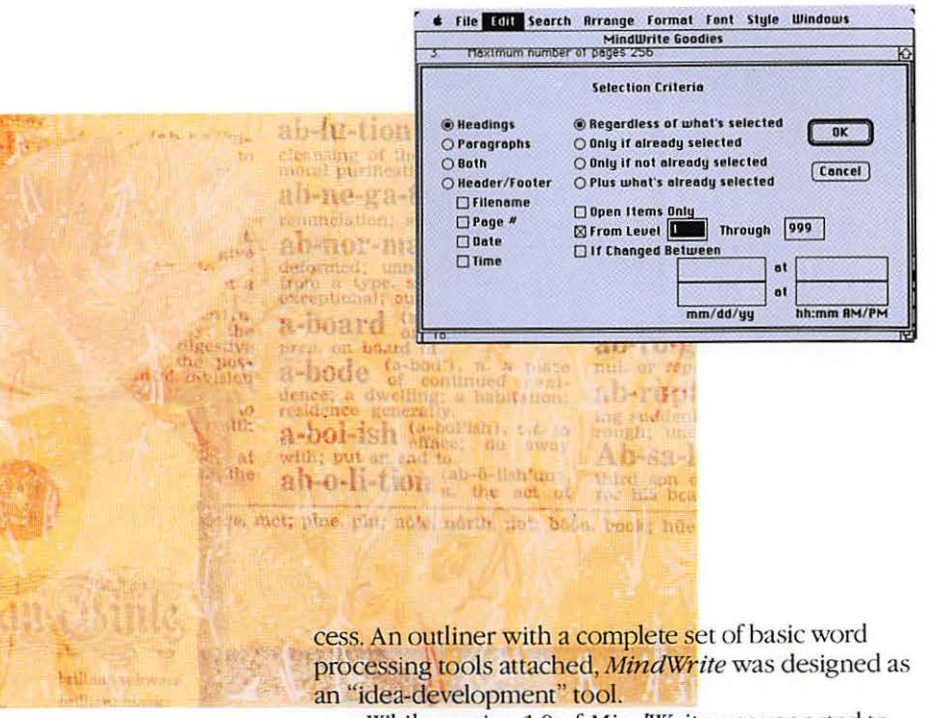



***Figure 4***
MindWrite *can select portions of a document based on the type of formatting, the outline level, and when the document was saved.*

cess. An outliner with a complete set of basic word processing tools attached, *MindWrite* was designed as an "idea-development" tool.

While version 1.0 of *MindWrite* was reported to be slow and somewhat buggy, version 1.1 performs well. *MindWrite* still slows down when paragraphs get lengthy, but in normal situations it is difficult to outtype the program. (The screen does blink annoyingly, actually going blank for a second or two, when paragraphs of over 20 lines or so are typed.)

Two particularly appealing *MindWrite* features are its selection and automatic marking functions. The selection feature allows you to select nonadjacent text blocks and format them without affecting the text in between. Additionally, this feature enables you to select blocks of text that meet certain requirements, such as being from certain outline levels or having been modified during a specified time period (see Figure 4).

The automarking feature places a vertical bar to the left of any text that has been modified after a given date and time or after a save operation. This particular feature could be invaluable to writers working as a team on a document, since changes are clearly apparent.

One of *MindWrite*'s creative tools is a function that can help jolt you from moments of writer's block. The Shuffle command randomly reorders a group of headings, giving you a chance to view your subject from a different perspective.

### Laser Author

*Laser Author* is the only one of the power word processors that doesn't include an outlining function. It does, however, provide a great deal of flexibility in designing how a page of text is presented.

The features that set *Laser Author* apart from the other word processors and enable it to function as a low-end page-layout program are its text and graphics frames. These frames can be any size and can contain either text or graphics. The program enables you to link several text frames, and text flows automatically between linked frames. Adjusting a text frame's size automatically reformats the text in the frame. Frames can be positioned virtually anywhere in a document. This same frame technique is used in a number of page-layout programs.

However, unlike those other page-layout programs, *Laser Author* does not require that you type text in frames. In fact, you can use *Laser Author* without ever using a text frame.

*Laser Author*'s creators also appear to have had the technical writer in mind. There are seven separate levels of subscripts and seven more levels of superscripts. You can overprint characters so that a variable in an equation can have both a subscript and a superscript in the same vertical plane (see Figure 5).

Despite its flexibility, *Laser Author* can be cumbersome. Changing point size or typeface is neither intuitive nor easy until you have specified the desired format as a style and listed it under the appropriate menu.

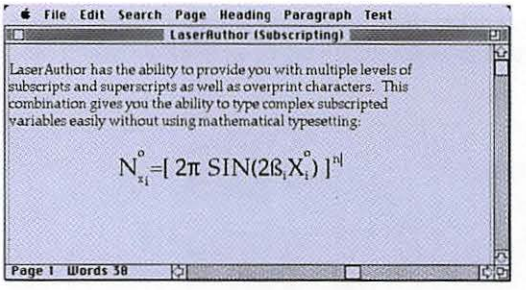



***Figure 5***
*You can use* Laser Author *to create typeset-quality mathematical equations because of its multiple-level super- and subscripts and its character-overprint option. This function is useful, but effective only for simple equations.*

## What's InAWord?

*InAWord,* a new word processor from Paragon Concepts, was scheduled to be released in the first part of this year. As with *FullWrite,* however, we couldn't get a look at the software. This information was supplied by the publisher.

*InAWord* will store its text as text information only. All formatting and graphics information will be stored in the resource fork of the data file. Thus, any application that can read text files will be able to read the text portions of *InAWord* files.

*InAWord* will offer ten clipboards that can be manipulated separately (including permanently saving the contents of a clipboard). Any rectangular section of text in an *InAWord* file–even if it's in the very center of a page of text–can be selected, copied, pasted, and changed. This feature should facilitate editing tables of data.

*InAWord,* a descendant of the *QUED/M* macro editor, will also incorporate macros. In conjunction with *InAWord's* powerful search and replace functions, these macros will be able to perform tedious tasks. For example, Paragon will supply a macro to extract phone numbers and names from many different files, place them in a new file, and alphabetize the entries by last name. Another macro will extract a day's appointments from a file, order them by time, and place them in a new file.

Other features that Paragon promises include outlining, checking for missing quotes and parentheses, sort functions, and automatic numbering in Roman or Arabic numerals. All menu items will have ⌘-key equivalents. Users will be able to assign functions to these ⌘ keys. *InAWord* will also provide automated indexing, table of contents generation, and footnoting.

**Last Words**

Almost all word processing packages offer a good selection of basic word processing tools. *Works* provides a good basic word processor as well as database, spreadsheet, and communication functions. The word processing module has an excellent interface with the database module for creating form letters.

*MacWrite* is the least expensive of the word processors ($50 less than *WriteNow* and *MS Write*). While it is not as powerful nor as flexible as some packages, it is still very widely used.

*WriteNow* offers a complete array of features and takes up only the same amount of disk space as *MacWrite.* It is shipped with file-translation software for reading *MacWrite, Word,* and text-only files. *WriteNow* also has considerably more flexibility in formatting documents than either *Works* or *MacWrite.*

*Microsoft Write* offers a very complete basic package with an 80,000-word dictionary, mathematical typesetting, elementary forms generation, and a handy column-moving feature. It is considerably less complex than *Word* but retains the same command and file structure for an easy upgrade, if necessary. However, *Word, MindWrite,* and *Laser Author* offer still more flexibility and advanced writing aids.

*Microsoft Word* is a complex program designed to satisfy almost all professional writers. Because it is complex, it is not easy to use and requires considerable training time. *Word* provides such specialized features as custom form generation, mathematical typesetting, and automatic links to *Excel* spreadsheets.

*MindWrite* is an idea organizer that will be most useful to those who rely heavily on outlines. It does not offer as many formatting options as *Word* or *Laser Author.*

*Laser Author* doesn't provide outlining features, but it does allow you to position text and graphics virtually anywhere on the page. It is an advanced word processor with page-layout capability.

To choose an advanced word processor, analyze the type of writing you do and then compare your work to the offerings listed in "Word Processors." There's no substitute for trying out the programs that look good to you, but if you've never used an advanced word processor, studying our comparison table is a good way to learn what to expect. Knowing what different programs can do and what options they offer will help you evaluate the programs you examine. □

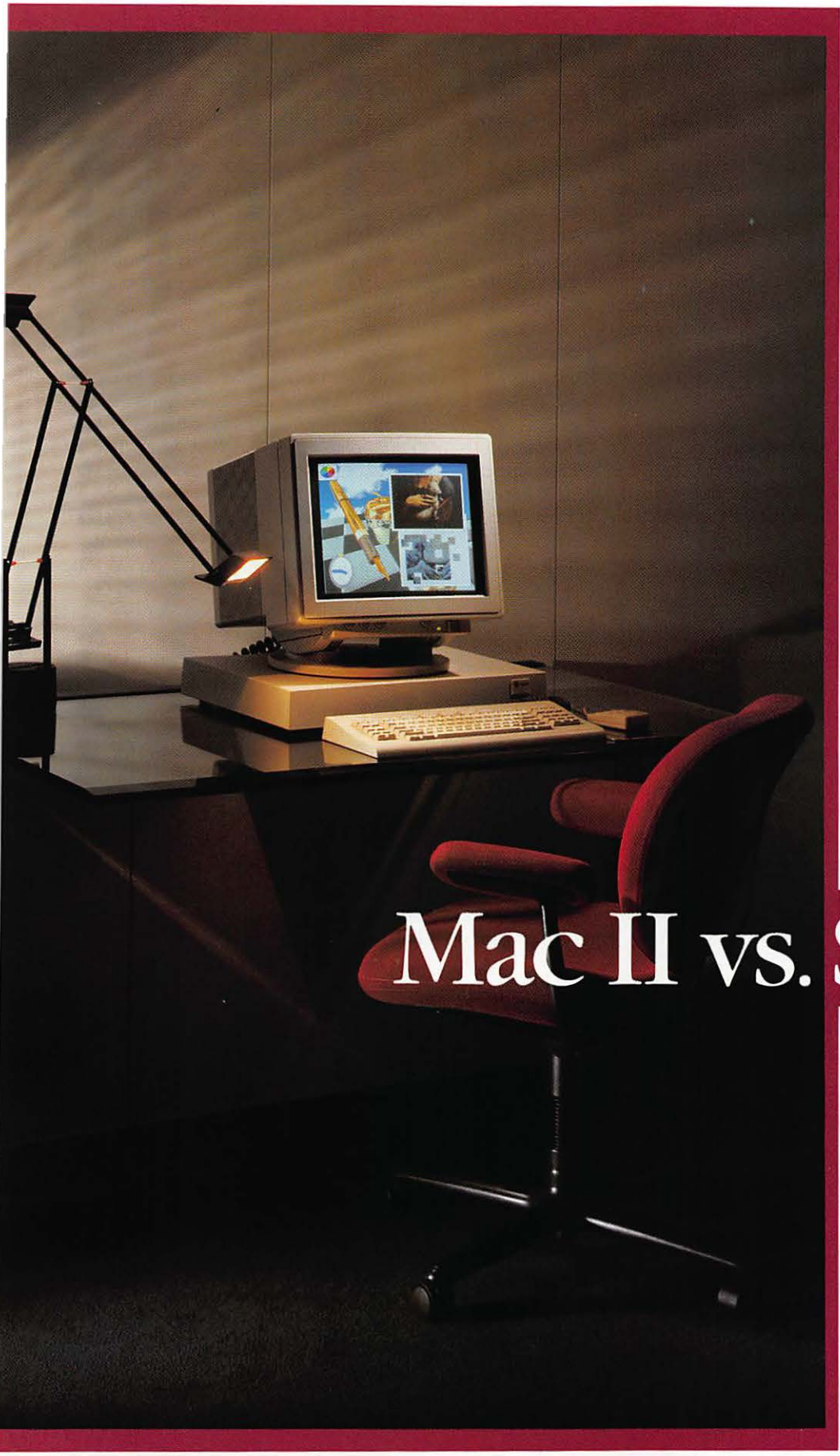
See *Where to Buy* for product details.

# Workstation Choices

*Apple faces stiff competition from Sun and Apollo in the workstation arena*

The Mac II—with its 68020 processor, math coprocessor, and 8 megabytes of RAM—at first glance appears to have a lot in common with workstations made by Sun Microsystems and Apollo Computer. But each manufacturer has taken an entirely different design approach. A closer look at the machines reveals major functional and performance differences.

While the Mac II is still missing some pieces—at last check, release of Apple's UNIX operating system, A/UX, was postponed until early 1988—we felt it was still worth making the comparison between the existing Mac II and comparably priced workstations. In our comparison, Andrew Shebanow looks at the Sun-3/60, and Harold Borkin evaluates the Apollo Domain DN/3000.



# Mac II vs. Sun-3/60

*by Andrew G. Shebanow*

Comparing the Mac II to the Sun-3/60, Sun's newest low-cost workstation, is inevitable as Sun moves its entry-level products down and Apple moves its high-end products up. To make the comparison as fair as possible, I chose similar configurations for each machine. While both systems are billed as low-cost workstations, neither system is cheap: the Mac II costs about $11,000, and the Sun-3/60G about $15,000 (see "Sun-Mac II Price Tags").

**Sizing Up the Competition**

Looking at the basic hardware, the two machines clearly have a great deal in common. Both systems can fit on a desk, but neither one could be called compact.

The Mac II is about the size of a large videocassette recorder and the Sun-3/60's cabinet is several inches wider and deeper than the Mac II. To make matters worse, the external disk and tape drive for the Sun and the external tape drive for the Mac II significantly increase each system's footprint.

Both machines use the Motorola 68020 CPU and 68881 Floating-Point Coprocessor, but the Sun-3/60 runs at 20 MHz, while the Mac II runs at 16 MHz. The Sun-3/60 uses a custom memory-management chip, which addresses up to 24MB per program. The Mac II can be equipped

PHOTOGRAPHS BY MARK JOHANN

with Motorola's new 68851 MMU (memory-management unit), which addresses up to 4 gigabytes, although applications can only address 16MB with the current Mac operating system (System 4.1).

Although both machines use Single Inline Memory Module (SIMM) RAM, with 1MB standard on the Mac II and 4MB standard on the Sun-3/60, the SIMMs are not interchangeable. The Mac II in this comparison had an additional 4MB of RAM installed, giving it 1MB more than the Sun. You can upgrade the Sun's RAM to 24MB on the system board, whereas you can only add up to 8MB on the Mac II's main board. Even though you can add NuBus memory cards, the NuBus memory can only be used as a RAM disk under the current release of the Macintosh Operating System (OS). Apple was reportedly working on a ROM patch that would allow applications to use up to 8MB of RAM per NuBus slot.

Both the Mac II and the Sun-3/60 offer a SCSI port to which you can attach a hard disk or other SCSI peripherals. The Sun's SCSI interface–unlike the Mac's–supports Direct Memory Access (DMA), so that applications can continue running while disk information is transferred to and from memory. Because the Sun-3/60 has no provision for an internal disk drive, I added an external 72MB hard disk. On the other hand, my Mac II came with an optional 80MB internal drive. Despite the lack of a DMA disk port, the Mac II's disk seemed relatively fast; programs seemed to load faster on the Mac than on the Sun. This was due more to the efficiency of the applications and the Mac OS than to the disk hardware.

In the area of network hardware, both the Sun and the Apple machines support Ethernet; in addition, the Mac II also runs the AppleTalk Personal Network system. While an Ethernet interface is standard with the Sun-3/60, you must add an Ethernet interface card on the Mac II. Both manufacturers connect to thick or thin Ethernet cable.

As with network hardware, the two systems take slightly different approaches to graphics hardware. Sun offers a variety of color and monochrome screens with more dots than Apple's Mac II equipment, while Apple lets you shop for third-party products if you need a larger screen. The Sun-3/60G's 19-inch monitor displays 1152 by 900 pixels. The Mac II's 12-inch monochrome monitor displays 640 by 480 pixels. Both monitors support 256 shades (8 bits) of gray. Available for the Sun are 16-inch and 19-inch color display systems that display more pixels, albeit at a higher cost than Apple's color Mac II system. (The Sun-3/60C, which can display 1152 by 900 pixels and up to 256 colors simultaneously on a 19-inch monitor, costs about $18,000.) While the Sun's extra screen area really makes a difference when you are working with large amounts of data, you can of course get Sun-sized screens for the Mac II from third parties like SuperMac or Personal Computer Peripherals Corporation. The Mac II's graphics card allows you to run in standard (1-bit) monochrome mode, which speeds up drawing a great deal. On the Sun-3/60 the system is always in 8-bit mode.

A major hardware difference between the Mac II and the Sun-3/60 lies in the area of expandability. The Mac II has 6 NuBus slots, 4 of which were unused in my system. The additional slots would allow you to add serial ports, or more advanced items like array processors or faster CPUs (like the 68030) when they become available. Like the original Macintosh, the Sun has no slots and therefore cannot be expanded. Sun does sell a system with 12 VME Bus slots (the Sun-3/160), but a 3/160 system equivalent to the Mac II would cost about $30,000.

## Sun-Mac II Price Tags

| Mac II Configuration | |
|---|---|
| Mac II (1MB, 1 floppy) | $3769 |
| Apple extended keyboard | $229 |
| Mac II video card | $499 |
| Video RAM upgrade | $149 |
| 12" monochrome monitor | $399 |
| 4MB RAM upgrade | $1198 |
| 80MB hard disk | $2699 |
| 40MB SCSI tape drive | $1499 |
| **Total (w/o UNIX)** | **$10,441** |
| Additional cost for A/UX system: | |
| Apple EtherTalk card | $699 |
| MC68851 PMMU (estimated price) | $499 |
| A/UX (estimated price) | $1000 |
| **Total (w/ UNIX)** | **$12,639** |

| Sun 3/60G Configuration | |
|---|---|
| Sun 3/60G (monochrome) includes 68020, 68881, 4MB RAM, 19" gray-scale display, 71MB hard disk, 60MB tape drive, programming languages, UNIX | $14,900 |
| UNIX manuals and tapes | $450 |
| **Total (w/ UNIX)** | **$15,350** |

### Installing the System

Setting up the hardware for a Macintosh II or a Sun is fairly easy. On both systems, this involves attaching the power, video, keyboard, and mouse cables, and attaching the computer to the network (if you have one). Although neither machine takes long to set up, the Mac II has the edge over the Sun in this area. The Mac's connectors are clearly labeled, and the installation instructions supplied were easier to understand. Furthermore because the Sun

# Sun Benchmarks

To test the performance of the Sun and Mac II machines, I ran the standard Sieve of Eratosthenes, Dhrystone, and Whetstone benchmarks, along with a hard disk performance benchmark (see Figure 1). The Sieve and Dhrystone benchmarks measure CPU performance, and the Whetstone benchmark measures floating-point speed.

On the Mac II, all benchmarks were compiled using Macintosh Programmers Workshop C (*MPW C*) version 2.0. The results using *MPW C* are much better than those published in early articles about the Mac II, which used the *Consulair Mac C* compiler.

The Sun benchmarks were run on a Sun-3/160, since my access to a Sun-3/60 machine was extremely limited. The times for all the benchmarks (except the disk performance benchmark) should be about 25 percent faster on the Sun-3/60 because of its higher CPU clock rate.—*A.G.S.*

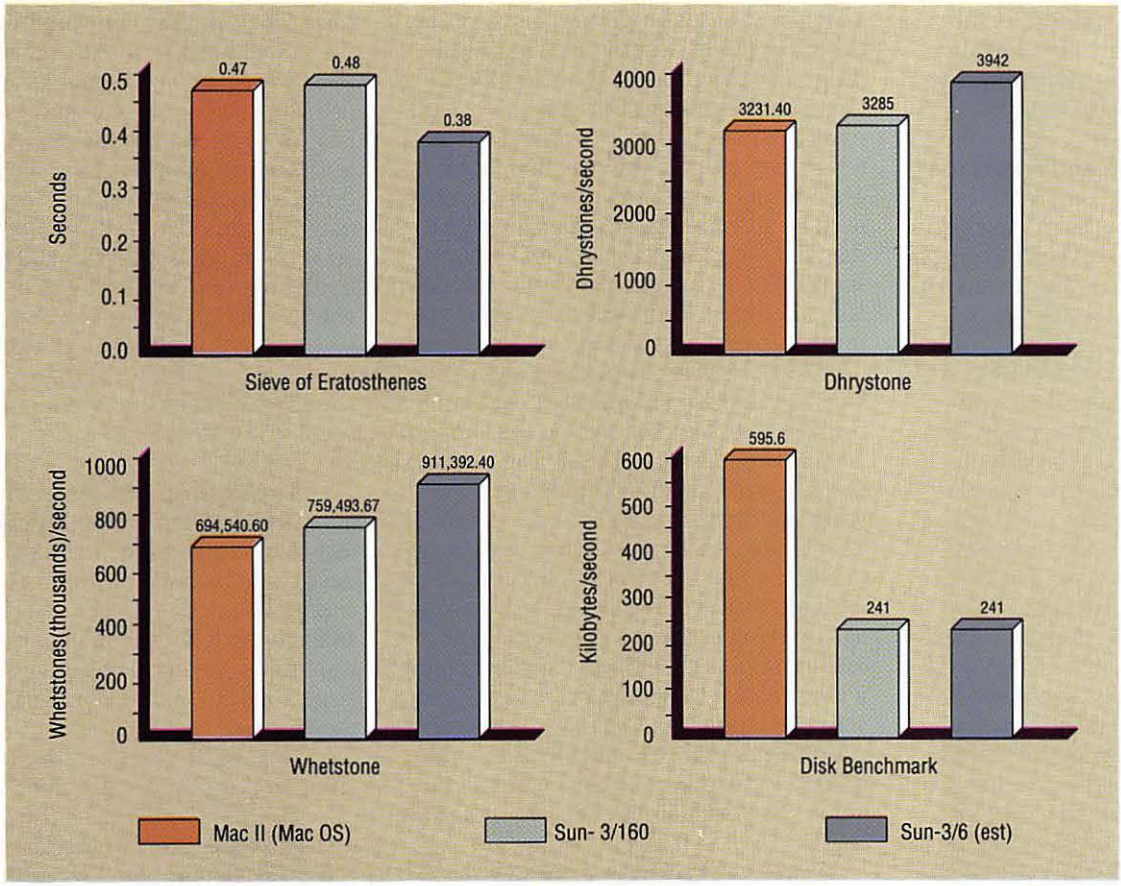



***Figure 1***

*Although the Sun tests were run on a Sun 3/160, results from the 3/60 were estimated based on the 3/60's 25 percent faster clock speed. Even though the Mac lacked a direct memory access disk controller, it outperformed the Sun on the disk test, a task which consisted of writing and reading 4MB of data to and from the disk drive. The disk performance differences are likely due to the disk overhead incurred by UNIX versus the Macintosh OS.*

weighs twice as much as the Mac II, moving it around during setup can be a problem.

Unlike the hardware installation, setting up the software for the two machines was not comparable. Installing the Mac II software was easy. I was able to get a Mac II up and running in about an hour, including the time it took me to load my favorite applications onto the hard disk.

Installing the Sun software was much more complicated. Sun ships its current operating system (version 3.4) on six tapes. The first four tapes contain Sun's version 3.2 operating system; the two additional tapes update that release to 3.4. Sun provides a semiautomated system installation and setup program, but the instructions are poorly organized and hard to follow, so installing the software is still a complicated task. A complete installation takes an experienced system administrator anywhere from two to four hours.

### Operating System and Interface

The most noticeable difference between the two machines lies in their operating systems. The Sun-3/60 runs a version of Berkeley UNIX, and the Mac II runs Apple's proprietary Macintosh OS. Sun's UNIX provides many features that are either unavailable or cost extra on a Mac II.

Sun UNIX, like all other UNIX systems, is a disk- and memory-intensive collection of software aimed at program developers. The programs that Sun provides include C and FORTRAN compilers, several different text editors, and many programming utilities. A typical installation of Sun's UNIX requires about 60MB of disk space. Most of this space is occupied by programs that are rarely (if ever) used. In fact a fair amount of disk space can be reclaimed by judiciously deleting a few files. Even though UNIX comes with hundreds of utility programs, if you're not a programmer, you'll still need to purchase at least one major application.

As opposed to Sun's full-featured development-system approach, Apple provides only the basic system software. You must purchase programming software separately. Apple's unbundling of application software makes it easy to configure a system that has all the programs a particular user needs without consuming vast amounts of disk space. Most users will be able to fit their system and all their applications into less than 20MB of disk space.

One of the key features that gives UNIX an advantage over the Mac OS is virtual memory. Virtual memory allows programs to address more memory than is actually installed in the machine. On the Sun-3/60, this feature lets every program use up to 24MB of memory for code and data, no matter how much physical memory the machine has. As a side benefit, virtual memory also protects the operating system and other programs from a system error that might occur while running a program. With the Mac II under MultiFinder, programs are allocated a relatively small memory partition (anywhere from a few kilobytes up to the machine's total available memory), and the total memory used by all running programs must be less than the physical memory size. The lack of support for virtual memory limits the Mac II as a vehicle for running applications like image processing and complex simulations.

Sun UNIX also provides a much more sophisticated type of multitasking than that possible with MultiFinder. On the Sun, processing time is shared by all programs, and one program can do computational work while another program accesses the disk. On the Mac, background programs are active only when the foreground program is idle, and disk access causes all processing to stop. Also, programs running on the Sun can communicate with each other, making it much easier to write server and spooler software. Apple has said that it is investigating more sophisticated forms of multitasking for a future version of MultiFinder, but for now MultiFinder falls short of Sun's UNIX.

Sun's UNIX also has a networking software advantage. In addition to built-in Ethernet support, Sun UNIX includes the Network File System (NFS), which allows any number of different machines on a network to share files. For the Mac II, you can buy file-sharing software such as *AppleShare* or *TOPS*. Like *TOPS*, NFS provides all the features of *AppleShare* without requiring a dedicated server. The similarities between *TOPS* and NFS are not surprising given Sun's ownership of *TOPS*. While both workstations can be networked with many different machines, including IBM mainframes and DEC minicomputers, Sun's NFS supports many more machines than does *TOPS* or *AppleShare*.

The user interface is becoming more of an issue these days, even on workstations geared for the technical arena. The better the interface, the more productive users will be. As most people know, the UNIX command-line environment is about as unfriendly as you can get. Sun tries to get around this problem by offering *SunTools*, a mouse-driven windowing environment layered onto UNIX. *SunTools* includes a few utilities that take advantage of the windowing environment, but most applications run in a shell window, which is somewhat like a terminal emulator. In each shell window, you communicate with UNIX using the standard command-line interface. Compared to the Macintosh Toolbox, *SunTools* seems slow and awkward: windows open and close more slowly, the system responds erratically to mouse events and typing, and scroll bars and menus are harder to operate. Closing or resizing a window under *SunTools* requires several separate mouse clicks. In fact, *SunTools* is so slow that it offsets the higher clock speed of the Sun CPU, making the machine seem slower overall.

### Applications Base

Workstations are typically popular in technical applications like computer-aided design and manufacturing (CAD/CAM), computer-aided engineering (CAE), design simulation, desktop publishing, and software development. The Sun-3/60 has a large application base covering all these areas.

The Mac II is weaker than the Sun machine in CAD/CAM, CAE, and design simulation. On the other hand the Mac II's total software base is much larger. The Mac II has a huge number of programs available for businesses (spreadsheets, accounting programs, and the like), many word processors, many different types of graphic arts programs, and several excellent desktop publishing programs. The CAD/CAM and CAE programs currently available for

the Mac are generally not as comprehensive as those available for the Sun. The Mac II is improving in these areas, however, since several CAD/CAM and CAE vendors that sell Sun-3 programs have announced versions of their software for the Mac II.

An important consideration is the fact that applications for the Mac II are often two to ten times cheaper than similar applications on the Sun. To name just one example, *Interleaf Publisher* for the Mac II is $4000 cheaper than the Interleaf product for the Sun.

### Conclusions

The Mac II is a powerful machine, and it is a strong alternative to the workstations sold by Sun. The Mac II and the Sun-3/60 offer similar performance, but the Mac II is easier to use and more responsive to user input. Most important, the Mac II's expandability means that it will continue to be a good workstation platform for some time to come.

The Mac II's operating system does need some additional work. Until it can support virtual memory, which Apple has promised with A/UX and the Mac OS, the Mac II will be unable to handle complex simulations and design analyses.

As more and more full-scale applications become available, the Macintosh II will look better and better as an engineering workstation.

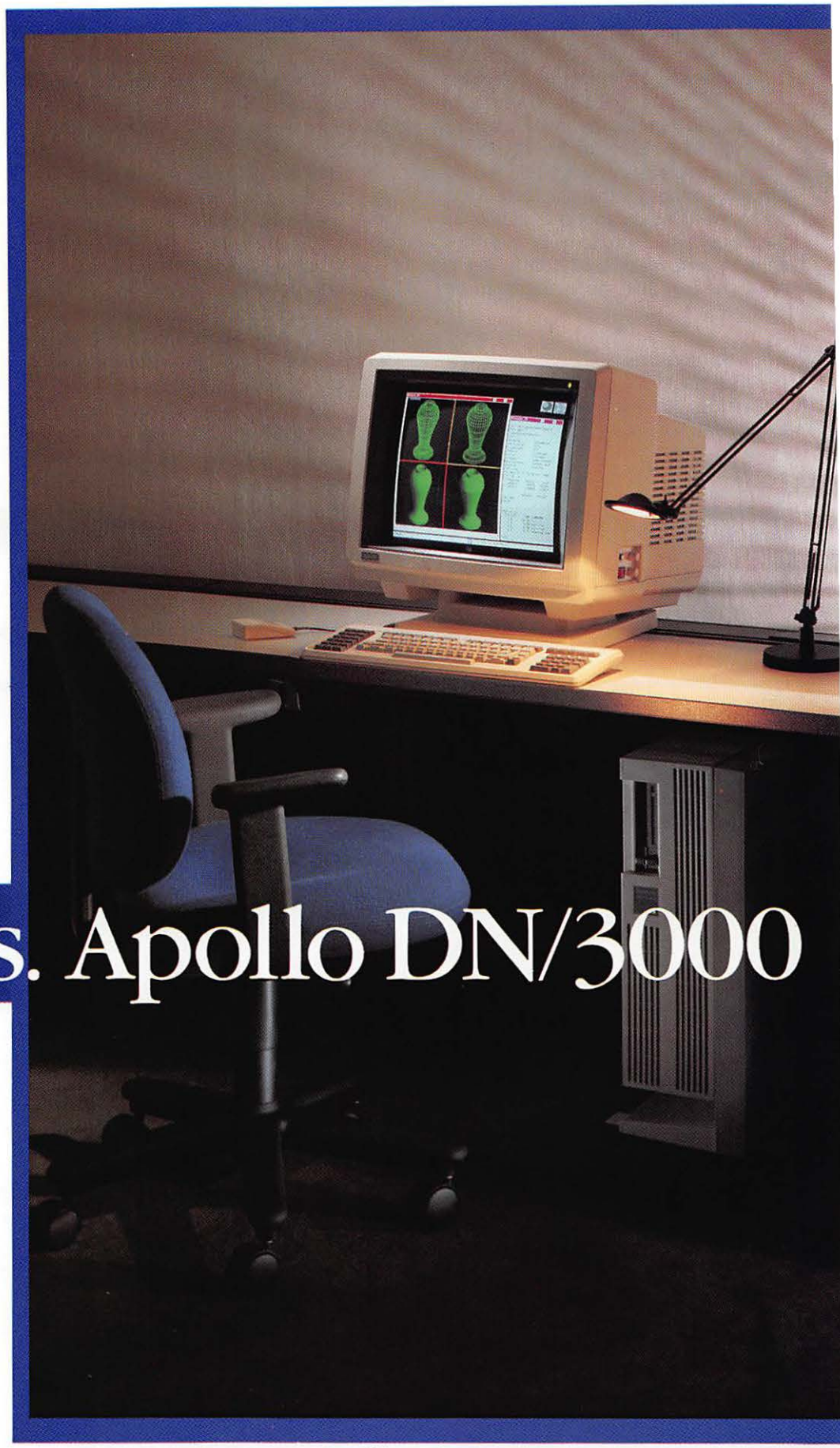
See *Where to Buy* for product details.

## Workstations Compared

| | Macintosh II | Sun 3/60G | Apollo DN/3000 |
|---|---|---|---|
| CPU | 16-MHz 68020/68881 | 20-MHz 68020/68881 | 12-MHz 68000/68881 |
| Memory management | Motorola 68851 MMU optional | Sun custom MMU | Apollo custom MMU |
| RAM | 1MB standard | 4MB standard | 4MB standard |
| RAM expandibility | Expandable to 8MB on system board (up to 80MB with NuBus cards) | Expandable to 24MB | Expandable to 8MB |
| Video card | 680 × 480, 8 bit/pixel color or gray-scale | 1152 × 900, 1 bit/pixel b&w<br>1600 × 1280, 1 bit/pixel b&w<br>1152 × 900, 8 bit/pixel color or gray-scale | Monochrome, 1024 × 800, 1 bit/pixel<br>Monochrome, 1280 × 1024, 1 bit/pixel<br>Color, 1024 × 800, 4 bit/pixel, 8 bit/pixel optional<br>Color, 1280 × 1024, 4 bit/pixel, 8 bit/pixel optional |
| Monitor | 12" analog gray-scale, 13" analog color | 19" digital b&w<br>16" analog, gray-scale or color | 19" digital b&w<br>15" or 19" analog, gray-scale or color |
| Mouse | Mechanical mouse, 1 button | Optical mouse, 1 button | Mechanical mouse, 3 buttons |
| Expansion slots | 6 NuBus expansion slots | No expansion slots | PC AT expansion bus |
| Networking | AppleTalk standard, Ethernet optional | Ethernet built in | Apollo ring standard, Ethernet optional |
| Hard disk storage | 80MB internal SCSI hard disk | 71MB, 141MB, 282MB external SCSI hard disk | 72MB internal SCSI optional |
| Floppy disk | Internal 800K 3½" floppy | None | Internal 1.2MB, 5¼" floppy optional |
| Tape backup | 40MB external SCSI tape | 60MB external SCSI tape packaged with hard disk | 60MB internal optional |
| Serial I/O | Two 230 kilobits/sec RS-422 serial ports up to 1 megabit/sec externally clocked | Two 19.2 kilobits/sec RS-423 serial port | One 19.2K-baud RS-232C serial port |

*by Harold Borkin*

# Mac II vs. Apollo DN/3000



The lowest-cost Apollo workstation, the Domain DN/3000, provides the fairest basis for comparison with the Macintosh II in terms of price. Apollo's top-of-the-line workstation, the DN/590 Turbo, offers exceptional three-dimensional color graphics performance but sells for $40,000 to $60,000. The DN/3000 costs $9000 to $18,000.

The DN/3000 desktop workstation is larger than the Mac II; in fact, it's more like the size of an IBM PC AT. Whereas the Mac II is based on a 16-MHz Motorola 68020 and a 68881 floating-point processor, the DN/3000 uses the slower 12-MHz parts.

**Memories Apart**

The DN/3000's memory can be expanded to 2-, 4-, 6-, or 8MB, whereas the Mac II lets you expand to 2-, 4-, or 8MB on the main board and more using the NuBus. Unlike the Mac II, the standard DN/3000 comes with a hardware memory-management scheme that provides a virtual memory capability and allows multiple programs to run simultaneously. The DN/3000 runs up to 56 concurrent programs, or processes.

The DN/3000's virtual memory allows each process to address up to 64MB, even though the most RAM you can install in the DM/3000 is 8MB. Traditionally, with virtual memory the sections of code or data that aren't being used are kept on disk and

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brought into RAM only when needed. Apollo has carried the concept a step further. The Apollo virtual-memory system extends to the network. As a result, to execute, a program need not be concerned with its location on the network or the location of the files it uses.

By comparison, the present Macintosh Operating System pales when it comes to memory management. Even with MultiFinder, which gives you the illusion of running more than one program, you can really only use one program at a time and only address the actual amount of memory you have installed in the Mac.

Apple promises that the optional 68851 Paged Memory Management Unit will provide the Mac II with virtual-memory capabilities, allowing programs to address up to 4 gigabytes. However, this will only be true when you are running Apple's A/UX operating system–still a nonshipping product when this was written.

### Network Connections

The DN/3000 can be ordered with either the Apollo token ring or an Ethernet network connection. The standard network used by Apollo is the company's own 12-megabit-per-second token-passing ring. As opposed to the open-ended bus configuration of AppleTalk or EtherTalk, Apollo workstations or servers are connected in a circle. A special bit pattern called a *token* travels around the ring, passing through each node. To send a message, a workstation or server must first grab the token and then generate the message.

The Ethernet option is a recent addition and is available only on the DN/3000 nodes. Apollo strongly supports multiple communications standards such as Sun's NFS, as well as X.25, MAP (Manufacturing Automation Protocol), and SNA (Systems Network Architecture) standards. The Apollo machines also run TCP/IP (Transmission Control Protocol/Internet Protocol) over Ethernet cable for connecting to DEC's VAX computers. On the Macintosh side, Apple recently introduced its Ethernet-based EtherTalk card for the Mac II. The TCP/IP-protocol software for the Mac is available from TOPS and from Pacer Software (see "The Ethernet Solution," *Macworld,* January 1988).

### NFS Must Wait for A/UX

The most significant part of the Domain concept is a networkwide distributed file system that allows users to share programs, data, and expensive peripherals via the network. The care with which Apollo has integrated the network into the operating system and hardware is a key strength of the Domain workstations. The Apollo network supports a range of functions that are difficult or prohibited in the Macintosh environment. One example of such a function is support for a networkwide registry that identifies all users without regard to what machine they use. Another example is the ability to run programs, or processes, on remote nodes.

## Apollo-Mac II Price Tags

| Macintosh II monochrome | |
|---|---|
| Mac II CPU | $3769 |
| Internal 80SC hard disk | $2699 |
| Apple 4MB RAM expansion | $1198 |
| Apple extended keyboard | $229 |
| Apple Mac II video card standard | $499 |
| Apple 12" monochrome monitor | $399 |
| **Total monochrome system** | **$8793** |
| Apple EtherTalk card | $899 |
| A/UX (estimated price) | $1000 |
| PMMU upgrade | $499 |
| **Total monochrome A/UX system** | **$11,191** |

| Apollo DN/3000 monochrome | |
|---|---|
| DN/3000 monochrome workstation includes 68020, 68881, 4MB RAM, 15" 1024 × 800 display, asynch RS-232C port, Domain ring network interface, IBM PC AT-compatible bus, UNIX and AEGIS system licenses | $4990 |
| 72MB hard disk and 1.2MB floppy disk | $3200 |
| **Total monochrome system** | **$8190** |

| Macintosh II color | |
|---|---|
| Mac II CPU | $3769 |
| Internal 80SC hard disk | $2699 |
| Apple 4MB RAM expansion | $1198 |
| Apple extended keyboard | $229 |
| Apple color video card (8 bit/pixel) | $648 |
| Apple 13" color monitor | $999 |
| **Total color system** | **$9542** |
| EtherTalk card | $899 |
| A/UX (estimated price) | $1000 |
| PMMU upgrade | $499 |
| **Total color A/UX system** | **$11,940** |

| Apollo DN/3000 color | |
|---|---|
| DN/3000 color workstation includes 68020, 68881, 4MB RAM, 15" 1024 × 800 × 4 color display, asynch RS-232C port, IBM PC AT-compatible bus, Domain ring network interface, UNIX and AEGIS system licenses | $8900 |
| 72MB hard disk and 1.2MB floppy | $3200 |
| Additional for 8-plane color control | $2400 |
| **Total color system** | **$14,500** |

# Apollo Benchmarks

At best the benchmarking of computers with different operating systems, using high-level languages, can give only very relative results. It's not always clear whether the tests compare the machines, the compilers, or the operating systems. All the tests I ran clearly indicate that the Mac II falls within range of the Apollo workstation's performance. The Mac II's performance exceeds that of the older entry-level Apollo machine (DN/300) and comes very close to that of the current Apollo DN/3000.

On the Mac II, the benchmarks were compiled with Consulair's *Mac C 020/881 Compiler* and a version of the Absoft FORTRAN compiler with added support for the 68020/68881.

The tests on the Apollo computers were conducted using the Apollo operating system AEGIS 9.2, and all tests were conducted on machines connected to a network containing more than 100 workstations. The tests were compiled with the CPU 3000 option. That option includes in-line code for the 68881 floating-point processor.

**Standards**

The general-performance tests included three often-cited benchmarks: the Sieve of Eratosthenes, Whetstones, and Dhrystones. To this I added a disk input/output test that wrote 1024 bytes to a disk file 1024 times, closed the file, then opened and read the file.

The benchmark results show that when using C the Mac II is as fast or faster than the Apollo machines. The DN/3000 is fast-

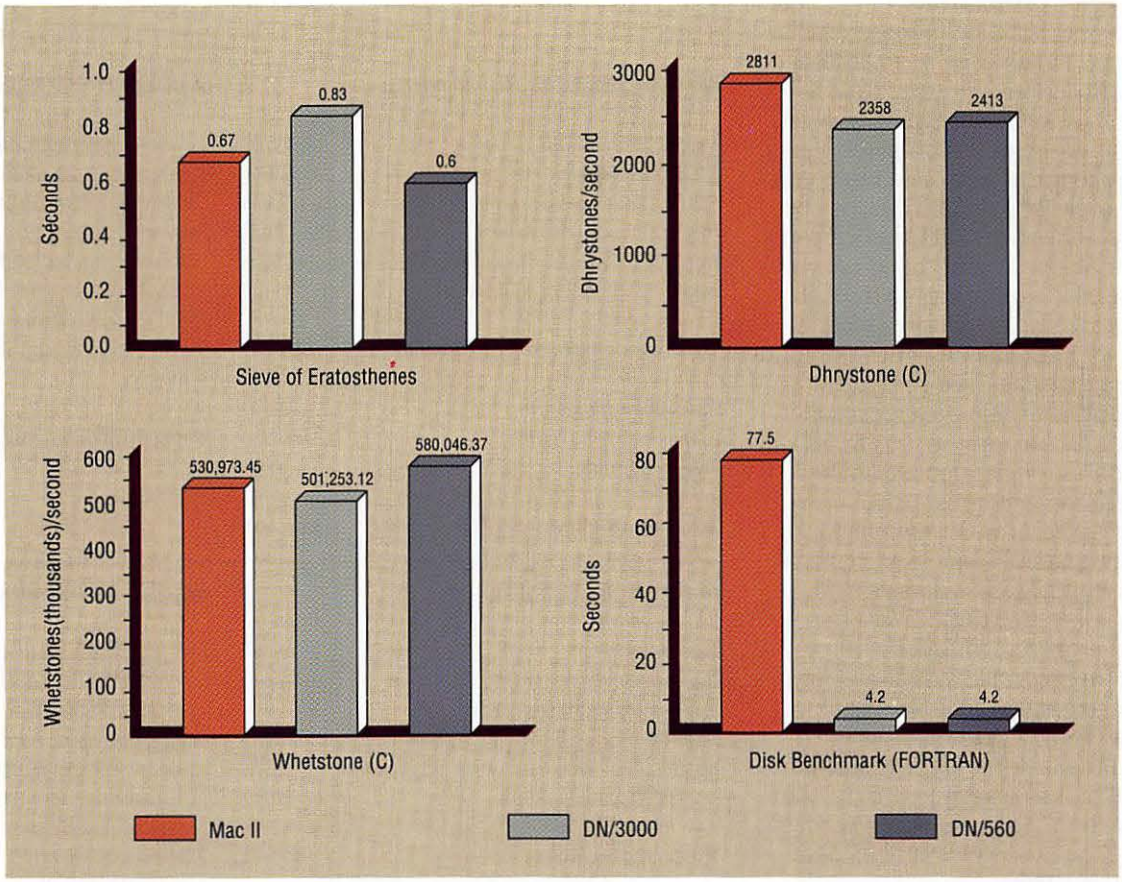



***Figure 2***

*The Sieve, Whetstone, and Dhrystone benchmarks for the Mac were written using Consulair's* Mac C *for the 68020 and 68881. The disk test was written using Absoft's FORTRAN compiler with 68020/6881 support.*

er, however, when running the FORTRAN-compiled benchmarks. The code produced by the very fast FORTRAN compiler ran faster on most of the tests than even the C tests on the same Apollo computer.

One of the major differences in hardware design between the Mac and the DN/3000 is the interface for the hard disk. On the Mac the disk is connected via the SCSI bus, and data is sent to the CPU via an 8-bit bus. The test results indicate that the DN/3000's disk system is 20 times faster than the Mac II's. Future tests of the Mac II using A/UX will indicate just how difficult a problem disk-slowness is.

**Complex CAD Task**

We recently had the opportunity to port an application, *Phdemo,* from the Apollo system to a Macintosh II computer. The program exercises all of the basic sketch input, 3-D geometric operations (union, intersection, and difference), and the drawing capabilities (wireframe, hidden-line) of our geometric editor ARCH_MODEL. I knew that if *Phdemo* would run in an acceptable manner the full system would also work well.

I wanted to use the Apple version of UNIX, but it was not ready in time. So I used the Macintosh OS and the *Absoft FORTRAN 020/881* compiler.

The speed of the machine is impressive. The *Absoft FORTRAN* compiles over 5000 lines of code per minute and the performance of *Phdemo* was noticeably faster than on the two-year-old Apollo DN/300. At one point I placed the Macintosh II next to a new Apollo DN/3000, modeled the same object on each machine, and observed that operations started at the same time on both were completed almost simultaneously.

To create a performance benchmark, I modeled a standard solid object. It consisted of a cube with a cylindrical hole drilled through each pair of faces. The holes intersected in the center of the cube, forming a complex space. I created the solid model by first performing the difference operation on the cube and a 24-facet cylinder; this operation formed a block with one hole. From this block I removed another cylinder, and from the resulting block I removed a third cylinder. Building this object took only a few moments (see Figure 2).

The benchmark was then run by repeating the last difference operation and drawing the solid with hidden lines removed. The chart in Figure 3 notes times for three events: completion of the difference operation, completion of the drawing of the screen, completion of the hidden-line removal.

The benchmark was run several times on each machine, and the times were very consistent over the runs. For the tests with the DN/3000 when the compiler option for in-line floating-point and 68020 instructions were used, the 12-MHz Apollo was almost twice as fast as the Mac II. This result isn't too surprising. The Apollo operating system and language compilers are tuned to achieve high performance, and the Macintosh II was using the old Mac operating system (System 3.2) and an unreleased version of the language compiler.—*H.B.*

**Graphics Subsystems**

The DN/3000 offers a choice of four graphics systems: two color and two monochrome. Unlike the graphics controllers for the Mac II, all DN/3000 graphics cards contain dedicated hardware to speed the drawing of screen images. The DN/3000's controller performs graphics operations such as drawing vectors, filling areas, transfering blocks of bits, and writing pixel patterns to the video RAM. On the Mac II these operations are all carried out by the 68020.

The lowest-cost DN/3000 monitor is a 15-inch monochrome screen that displays 1024 by 800 pixels. In contrast the standard monochrome monitor for the Mac II is smaller (12 inches) and displays fewer pixels (640 by 480). While Apollo offers a high-resolution 19-inch monochrome screen that displays 1280 by 1024 pixels, Mac II owners must look to third parties like SuperMac, Radius, E-Machines, Moniterm, Sigma Designs, and Cornerstone for high-resolution 19-inch systems.

In terms of color displays, the most inexpensive color system from Apollo displays 1024 by 800 pixels. Apollo uses a scheme similar to one used by Apple on the Mac II, employing a color lookup table to translate 4-bits-per-pixel color information into 12 bits of color intensity. This provides for displays of up to 4096 colors, of which 16 can be displayed at any time. A more expensive 8-plane color display controller, like the Mac II's color board with the video expansion option, displays up to 256 colors from a palette of 16 million. As with the monochrome monitors, you can choose from either 15-inch or 19-inch noninterlaced monitors from Apollo, whereas with the Mac II Apple offers only the 12-inch color display. Third parties like Personal Computer Peripherals Corporation and SuperMac, however, offer 16-inch and 19-inch color monitors with a resolution exceeding that of the DN/3000's. For comparison's sake it's worth noting that the high-performance DN/590 Turbo displays up to 16.7 million colors at a time (24 bits of color information per pixel). Only Raster-Ops and SuperMac have announced a 24-bits-per-pixel color graphics board for

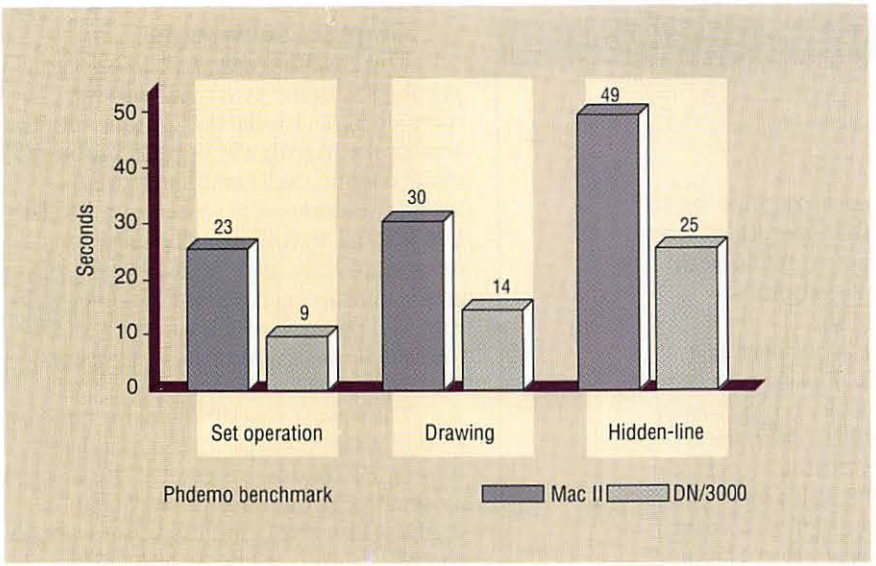
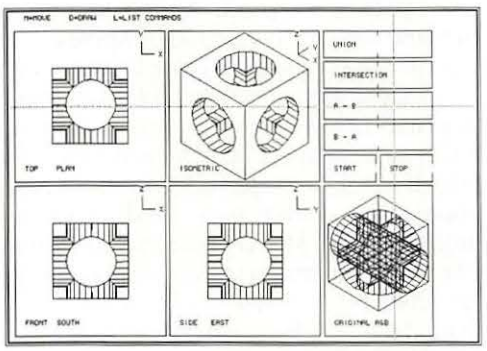



***Figure 3***

*The* Phdemo *program was ported to the Mac and run under the Mac OS. The time it took to arrive at various stages in the construction process was compared for the Mac II and the Apollo DN/3000 (see chart). The final output is shown below.*



the Mac II. Neither product was shipping at the time this article went to press.

### Apollo's Operating System

Apollo describes Domain as a computing environment that supports a full range of industry and de facto standards, as well as numerous communications protocols. Whereas in the past Apollo strictly used a proprietary operating system, AEGIS, more recently Apollo has been moving toward the open-system view. Currently AEGIS integrates both the Berkeley 4.2 and AT&T System V versions of UNIX.

A multiple-window display manager lets users simultaneously run UNIX along with other applications in different windows. Unlike with the Mac II running the Macintosh OS, the Apollo machines allow you to change windows without stopping a running process. Processes that you start on remote processors can also display output in separate windows. Apollo also supports the X Window System, a hardware-independent windowing system.

The Apollo workstations come with hardware and software to support various workstation graphics standards—unfortunately Apollo uses neither PostScript nor the QuickDraw standards.

### Applications Compared

To a large extent, the applications that are available for the Apollo system are much different than those that are available for the Macintosh. The Apollo has a large base of engineering applications provided by companies that offer integrated applications and hardware. These original equipment manufacturers (OEMs) make up a large portion of Apollo's distribution network. Apple on the other hand has only recently gotten into the OEM or value-added reseller market.

While an expanding number of developers provide large and complex solutions to specialized problems in technical areas like engineering, there is a dearth of low-cost, easy-to-use, general-purpose software, such as exists for the Mac and even for the Mac II. The installed base of workstations does not currently justify a need for this kind of software—Dataquest in its February 1987 newsletter estimated that only 62,000 workstations were shipped in 1986. As a result most workstation manufacturers, including Apollo, offer their users the ability to run PC applications in a window environment.

The Spring 1987 Apollo Applications Summary lists 770 software and hardware products from over 360 vendors in 20 application areas, including animation; architectural, chemical, civil, structural, manufacturing, mechanical, plant, power systems, and software engineering; artificial intelligence; communications; computer-aided publishing; data management; life sciences; earth resources; electronic design; graphics; and technical office. Electronics design and mechanical engineering have the largest base of products. The Mac overlaps with the Apollo in the following areas: computer-aided publishing (Interleaf, manufacturer of computer-aided publishing software for Apollo and Sun, has announced a version that runs on the Mac II); mechanical engineering (MacNeal Schwendler sells a large-scale finite element analysis program for both the Apollo and the Mac); and software engineering.

In contrast with easy-to-use Macintosh software, Apollo applications are complex and take much more time to learn and master. For example Aldus's *PageMaker* is a snap to learn compared to *Interleaf Publisher* on the Apollo. Companies like Auto-Trol Technology Corporation and Calma have applications for geometric modeling, analysis, detailing, documentation, and mechanical-product manufacturing that have no counterpart on the Mac II. □

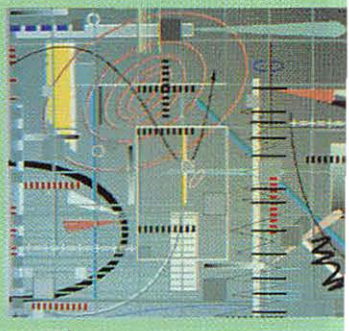
See *Where to Buy* for product details.

*Win big in Macworld's first annual*

# *Mac Art Contest*

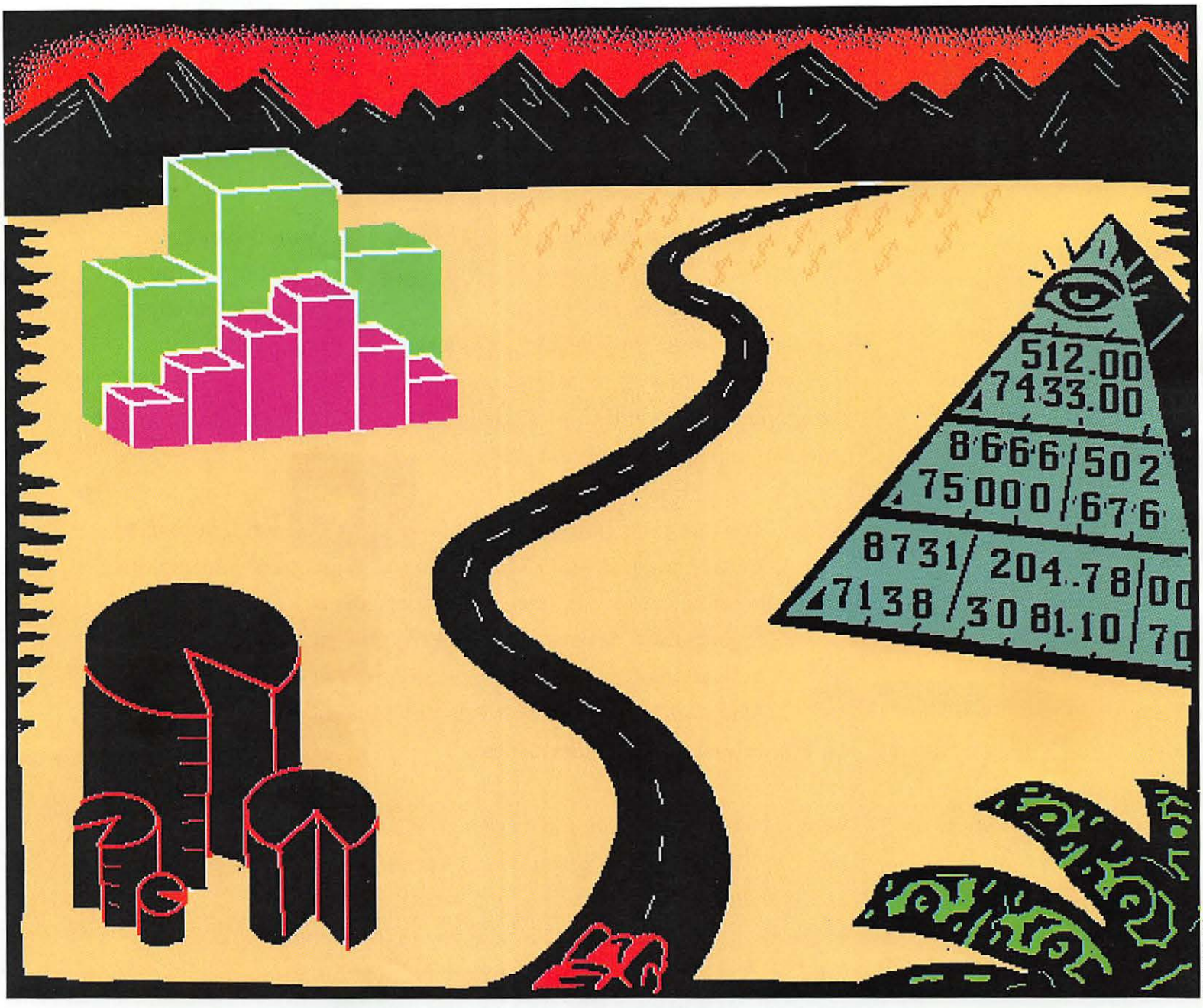
Macintosh graphics are looking better than ever. The arrival of the Mac II; new input and output devices of all kinds; and new software for illustration, layout, image processing, and design have made the jaggy, monochrome "Mac look" a fond memory. To spotlight this action in the graphics arena and to promote artistic excellence, *Macworld* is launching an annual contest.

For this competition we're interested in Mac art in the broadest sense. In addition to fine art and illustrations, we'll be looking for mechanical designs or 3-D renderings, layouts from desktop publications, presentation graphics, animations–anything that's visually exciting and shows off the Mac's abilities. Color or black-and-white entries will be judged on innovation as well as aesthetics.



Winners will be announced in August at SIGGRAPH 88 in Atlanta. Winning entries will appear in the magazine and in a special graphics calendar we'll produce at the end of the year. Other prizes, including Mac graphics hardware or software, will be announced in next month's magazine–along with the final contest rules. The important thing now is to get to work, since *Macworld* must receive all entries no later than April first.

We know you produce your Mac art for art's sake–or maybe for the sake of your business–but a little fame and fortune won't hurt. Be sure to look here next month for submission information and other details.




SCOTT BALDWIN

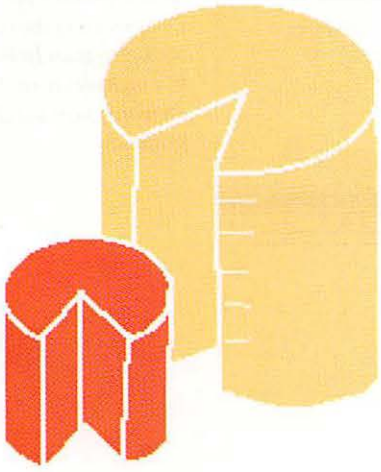
# The Numbers Racket

## *An insider's guide to selecting a spreadsheet*

***by Charles Seiter***

Spreadsheets are the second most widely used application for personal computers; they fall right below word processors in popularity. The Macintosh spreadsheet market, for the last two years, has been dominated by the success of *Microsoft Excel*. In the IBM PC world, the leading position of Lotus *1-2-3* has spawned numerous clones and workalikes. In contrast, the leading Mac spreadsheets are distinct products with great individual character. As a result, if you have even a vague appraisal of your number-crunching needs, you should find it easy to pick an appropriate spreadsheet.

Modern spreadsheets offer many features in calculation, convenience, and formatting–a complete comparative features list would point out more than two hundred items to consider. Some of these may be critical for your work, but often your decision will be based on simpler considerations. We'll give you all the details later, but for now let's start with a rapid mix-and-match guide–in case you need to rush out and buy something this afternoon.



## A High-Velocity Spreadsheet User's QuickSort...

■ *Beginner's Luck* You just bought a Macintosh because you need to do a modest number of form letters and keep simple accounts for a mail-order business you run on weekends from your home. You hate reading manuals and need to get results on the first day. You need *Works* from Microsoft.

■ *Reporting for Duty* Your office chores have been expanded to include producing a weekly summary of departmental activities and a daily report of expenses. The report format stays the same, but the numbers change rapidly, and the boss expects you to provide some graphics to show day-by-day and week-by-week trends. You need *Jazz* from Lotus.

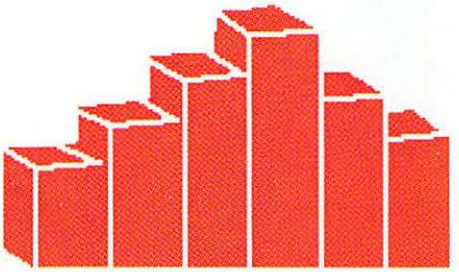
■ *The Calculating Type* You're an old hand at *MacWrite* and *MacPaint* but now have to introduce tables of numbers into your work. Basically, you need to run up attractive tables and paste them into word processing documents, easily and quickly. You need *MacCalc* from Bravo Technologies.

■ *High Tech* As a financial or engineering professional, possibly a consultant, you're responsible for developing complex models with lots of computation. You must also make convincing, graphics-based presentations of your conclusions, often to nontechnical types. And *you* design the presentation, not your art department. You need *Trapeze* from Data Tailor.

■ *The View from the Top* You expect to review spreadsheet numbers every day. You must evaluate budgets, sales trends, and other business basics; you need to bring maximum firepower to conference room decision-making. Sometimes you simply want to impress *1-2-3* users. You need *Excel* from Microsoft.

### The Details Are the Business

Such oversimplified guides (you're rich, buy a Ferrari...you're broke, ride the bus) need to be supplemented by a feature-by-feature look at the capabilities of these programs. At the outset, please note that any one of them would have looked like a futuristic dream spreadsheet four years



ago–they're all very good programs. But "good for whom?" is the question we want to answer, and to do so we must match features to needs.

*Works* and *Jazz* are integrated programs, with built-in database, communications, and word processing modules besides their spreadsheets. *MacCalc* is a pure spreadsheet with some database capabilities; *Excel* has charting and more extensive database features; and *Trapeze* has charts, database features, and page-layout features controlling text and pictures. You can buy as little or as much functionality as you want, and the products are priced accordingly. You should inspect "The Point Spread" for a detailed list of features, and consult "Glossary" if any of these features are new to you. You might consider this list of questions as a starting point:

- Am I planning to develop custom applications for co-workers or other users (macros)?
- Am I likely to use one small spreadsheet, one large spreadsheet, or many smaller sheets that relate to one another (links)?
- Do I need to read or write files from IBM PCs or other Macs (file formats)?
- Are the results for my own information or for use at meetings or in reports (presentations)?
- Do I know or care what an arctangent or standard deviation is (functions)?
- Do I need some independent way of monitoring errors in my work (error checking)?
- Would I like to automate routine "what-if" calculations (tables)?

With the answers to these questions and an inside look at the style of each program, you'll have no problem picking the spreadsheet that's right for you.

### The Works (Almost)

Let's be blunt. Microsoft's programmers designed *Excel* to be the ultimate power spreadsheet in the micro universe. They designed the spreadsheet in *Works* to do nearly anything you might want a spreadsheet to do, except compete with *Excel*. They succeeded.

The spreadsheet in *Works* is based on the older program *Multiplan*, a best-seller in the early days of the Mac. Simple charting features have been added to the spreadsheet. There's an integrated database and an integrated word processor for streamlined report-making, and the *Works* disk-based tutorial will turn absolute beginners into old hands in a day or so (see Figure 1). The documentation is helpful and thorough. And since Microsoft means never having to say you're lonely, there are dozens of user-developed application templates available, from biorhythms to zymurgy, in Heizer Software's *Works-Xchange*. What more could you want?

You could want more than one font, more than five chart styles, and lots more speed. You could want macros and direct file import/export from the Lotus WKS format, the PC standard. These limitations make *Works* a shirtsleeve home-office product rather than a three-piece-suit business program. The spreadsheet in *Works* has several nice convenience features–it can sum numbers in a point-and-click mode and communicate easily with its database–but its presentation facilities are clearly designed for your eyes only.

### Jazz 1.A: The Old

Lotus originally touted *Jazz* as the integrated solution to all Mac problems but has found that Mac users tend to favor individual power applications (*Word, WriteNow, Excel, Helix,* or *Omnis3,* for example) over weaker modules. The spreadsheet in *Jazz* couldn't compete with *Excel* for the high end of the market (no macros), and at the low end the package was too expensive for casual users.

Nonetheless, *Jazz* has two features that make it a perfect match for some users' needs. First, it reads and writes WKS and SYLK files, including formulas. This means that work in a *Jazz* spreadsheet can be shipped to another Lotus or Microsoft program and likewise that *1-2-3* or *Excel* files

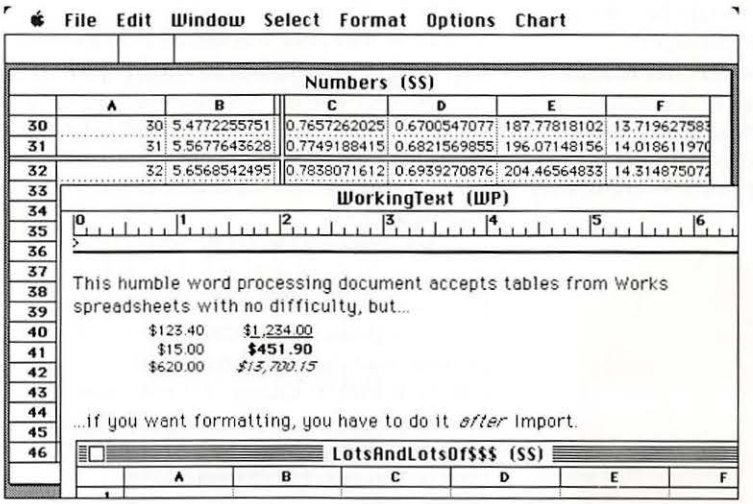



***Figure 1***
Works *lets you open lots of windows and split them up, down, and sideways. It's great for projects composed of many independent elements. The* Works *spreadsheet owes more to the older* Multiplan *than to* Excel *but includes straightforward, nondazzling graphics.*

# The Point Spread

| | Excel | Jazz | MacCalc | Works | Trapeze |
|---|---|---|---|---|---|
| **Calculation** | | | | | |
| Maximum size | 16,384 × 256 | 8192 × 256 | 999 × 125 | 9999 × 256 | 32,000 × 32,000 |
| Minimum memory | 512K | 512K | 512K | 512K | 512K |
| Minimum storage | 400K (2) | 400K (2) | 400K (2) | 400K (2) | 800K |
| Maximum cell size (number of characters) | 256 | 256 | [1] | 200 | [1] |
| Macros | ● | | | | |
| Arrays | ● | | | | ● |
| Tables | ● | | ● | | ● |
| Links (sheet-to-sheet) | ● | | | ● | ● |
| Templates | ● | | ● | ● | ● |
| **Functions** | | | | | |
| Math | 18 | 26 | 20 | 20 | 43 |
| Stat | 18 | 7 | 7 | 8 | 15 |
| Logic | 10 | 18 | 7 | 10 | 10 |
| Date | 10 | 11 | 5 | 0 | 17 |
| Finance | 8 | 5 | 5 | 8 | 9 |
| String | 7 | 17 | 0 | 0 | 6 |
| Other | 13 | 12 | 4 | 8 | 37 |
| Function total | 84 | 96 | 48 | 54 | 137 |
| **Windows** | | | | | |
| Split | ● | | ● | ● | ● |
| Multiple | ● | ● | | ● | ● |
| **Charts** | | | | | |
| Types | 42 | 10 | 0 | 5 | 11 |
| Links to spreadsheet | ● | ● | | ● | ● |
| Control shading | ● | | | | |
| **Database functions** | | | | | |
| Search | ● | ● | ● | ● | ● |
| Hlookup, Vlookup | ● | ● | ● | ● | ● |
| Range names | ● | ● | ● | ● | ● |
| **Presentation** | | | | | |
| Choice of fonts | ● | ● | ● | | ● |
| Cell style choice | ● | ● | ● | ● | ● |
| Mix fonts | | | ● | | ● |
| Page preview | ● | | | | |
| Print range | ● | ● | ● | ● | ● |
| Headers/footers | ● | ● | ● | ● | ● |
| **Auditing** | | | | | |
| Automatic error checking | ● | | | | ● |
| View formulas | ● | ● | ● | ● | ● |
| Annotate cells | | | ● | | ● |
| **Data exchange** | | | | | |
| WKS data | ● | ● | ● | | |
| WKS models | ● | [2] | ● | | |
| SYLK data | ● | ● | ● | ● | |
| SYLK models | ● | ● | | ● | |
| Text | ● | ● | ● | ● | |
| PICT import | | | | ● | ● |
| PICT export | | | | | ● |
| **Advanced math** | | | | | |
| Regression | ● | | | | ● |
| Array operations | ● | | | | ● |
| Matrix operations | | | | | ● |
| Direct 68881 calls | ● | | ● | | ● |

[1] Cell size is user-defined.
[2] Import only.

## Glossary

Spreadsheets are loaded with features that are often unfamiliar to beginners and experienced users alike. Even some satisfied spreadsheet program owners have never ventured to explore features that could prove invaluable at a later date. This little glossary might motivate you to explore new ground, as well as help you puzzle out the features table.

**Macros** A macro lets you record a series of keystrokes. You can do simple things (format a cell as dollars, with commas, by a single key-combination) or complex things (evaluate four investment schemes for internal rate of return and put the winner in a report). *Excel* supports command macros, essentially an automated use of menus, and function macros, for which you define and name your own special functions.

Besides *Excel*'s built-in macros, programs like *Tempo* allow you to define macros for use with spreadsheets like *MacCalc,* and macros for *Works* are available from Lundeen Associates. Macros are promised for the next incarnation of *Jazz.*

**Links** Linking is straightforward: it lets you reference a cell or cell range on another spreadsheet. Usually you will have a large, base spreadsheet (the *supporting spreadsheet*) and smaller spreadsheets sharing its data (the *dependent spreadsheets*). A chart attached to a spreadsheet is always a dependent document in the same sense. Linking also allows you to perform arithmetic, in a summary worksheet, on data pulled from several worksheets at once. Linking is another power feature, like macros, that has been particularly polished and simplified in *Excel.*

**File formats** There are exactly two important file formats: WKS (the *1-2-3* format in the PC world) and SYLK (Microsoft's general-purpose format used by *Excel, Works,* and the older program *Multiplan*). Unless you know that you won't have to exchange files with anyone, make sure that the spreadsheet you pick can read and write to these formats (preferably, including formulas).

**Presentation** Some programs, notably *Trapeze,* contain the functional equivalent of a page-layout program. In others, graphics range from nonexistent (*MacCalc*) to adequate (*Works* and *Jazz*) to superior (*Excel*). For the fanciest

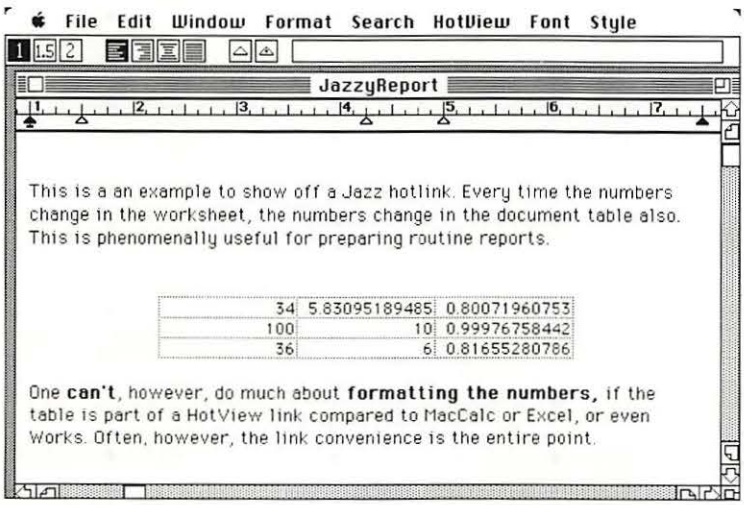



***Figure 2***
*Jazz links spreadsheet ranges to text documents through the nifty HotView feature (change numbers in the spreadsheet and they change immediately in the text). Jazz's strength in producing standard reports depends on this feature; in other respects the spreadsheet needs its long-awaited update.*

can usually be used with no tinkering or corrections. Second, *Jazz*'s unique HotView feature lets you paste a "live" spreadsheet section and a "live" graph into a text document. When numbers in the spreadsheet are changed, the changes will automatically be reflected in the numbers and graph in the text document. If you must regularly prepare routine reports in a standard format, you will be very, very happy using *Jazz* (see Figure 2). Otherwise, it's slow, something of a memory hog, allows you to choose only one font and limited styles, and offers no online help.

### Jazz: Modern?

Lotus, a rich and resourceful company that was none too happy about *Jazz*'s fate in the marketplace, will soon introduce a souped-up product, currently named *Modern Jazz.* The spreadsheet module will im-

graphic effects, files may need to be exported to a special-purpose program like *Cricket Graph*. Despite the abundance of graphing facilities in these programs, day-to-day work is better enhanced by easy row-and-column manipulation–you probably won't need to do multiple graphs every day.

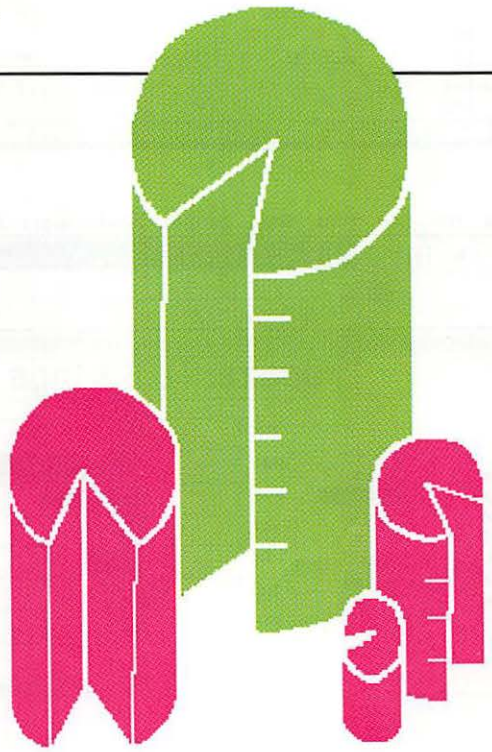
**Functions** If you want a built-in gudermannian function and advanced matrix algebra, you'll have to get *Trapeze*. If you want lots of DATE functions, you'll need *Excel*. Otherwise, all these packages have functions for computing monthly payments, trig and log functions, and simple statistics. The Mac environment ensures that the programs all have the same numerical accuracy, if not speed. (*Excel, Trapeze,* and *MacCalc* are fast; the other two spreadsheets are slower.)

Since *Excel* lets users define function macros, you can also order from Heizer Software whole libraries of advanced mathematical and engineering functions to add into *Excel*.

**Error checking** All spreadsheets flag simple errors like divide-by-zero. They all spot circular references as well (a calculation in which a cell refers to itself either directly or through another cell). Advanced spreadsheets (*Excel* and *Trapeze*) let you implement tricky calculations in this way, if you wish–the others prohibit it.

The error most often responsible for truly weird results in spreadsheets is accidental input (forgetting a decimal point is an example). You can automatically check input and output value ranges if you have macros (*Excel*), or put an error-checking block at the bottom of a spreadsheet using repeated IF constructions, if you don't have macros.

**Tables** A table is a special partitioning of a spreadsheet to create an internal mini-spreadsheet. Tables can typically be manipulated with a spreadsheet's database commands. The most common business application is the "what-if" table, in which one or two input values (an interest rate, a down payment) are used to generate an array of values representing different financial approaches to a problem.



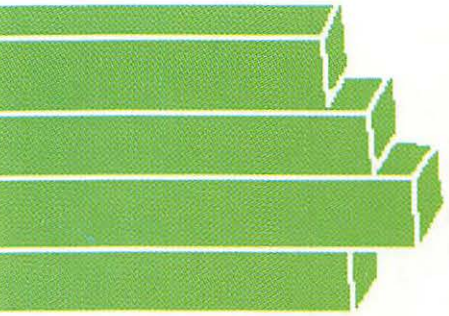
plement improved memory management and recalculation methods and will provide access to a command language similar to that in Lotus's PC product *Symphony*. The command language, which falls somewhere between a macro facility and a full language like C in functionality, will let experienced users prepare complex applications driven by a few keystrokes. While this may not cause *Excel* users to switch teams, it will probably be helpful to *1-2-3* and *Symphony* users migrating to the Mac environment. One hopes that Lotus's programmers have heeded the eerily prophetic words of an old song:

> *I got no kick against modern jazz/ unless they go and play it too darned fast/ and lose the beauty of the melody/ until it sounds just like a symphony...*
>
> (Chuck Berry, "Rock and Roll Music")

### MacCalc: The Name Says It All

In contrast to the two integrated do-all products, *MacCalc* is just a spreadsheet. It doesn't do charts and it only opens one window at a time (see Figure 3). But *MacCalc* is as fast or faster than *Excel* on non-68881 Macs; it's the cheapest spreadsheet you can buy; and it has one feature that *Works, Jazz,* and *Excel* can't match: it gives you complete control, cell-by-cell, over the text and number formats in your document. You can do big titles, bold cells, italic cells, cell borders, and all other format choices, and you can cut-and-paste formatted work into *MacWrite* or other word processors with formatting intact and column structure preserved. At a street price in the $70 range, it's practically worth buying as a utility for laying out tables.

But *MacCalc* is a very competent spreadsheet as well. Besides superior recalculation speed, it reads and writes WKS files (including formulas) and SYLK files (data only). *MacCalc* features a short, clear manual along with Operators, Functions, and Help on the menu bar itself. Basically, this program is as easy to use as the spreadsheet in *Works,* with the added benefit of deluxe formatting capabilities.



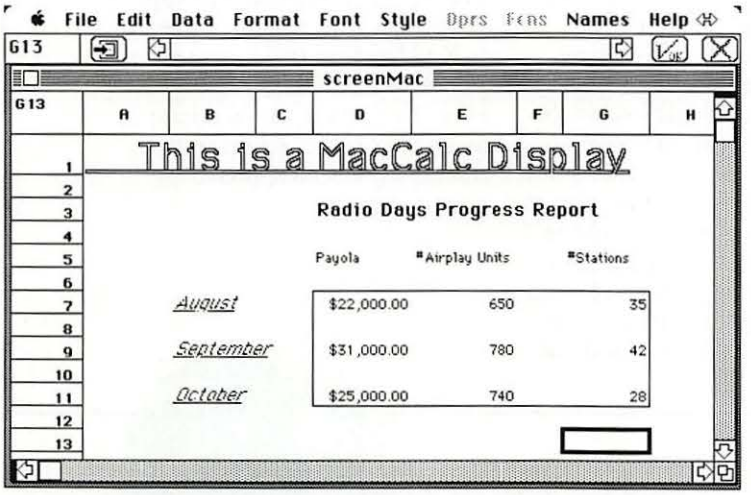



***Figure 3***
*It doesn't link related spreadsheets and it doesn't do charts, but* MacCalc *has more text-formatting tricks up its sleeve than any other spreadsheet. This table can be sent directly to a printer (laser printer results are particularly nice) or pasted into a* MacWrite *document, formatting intact.*

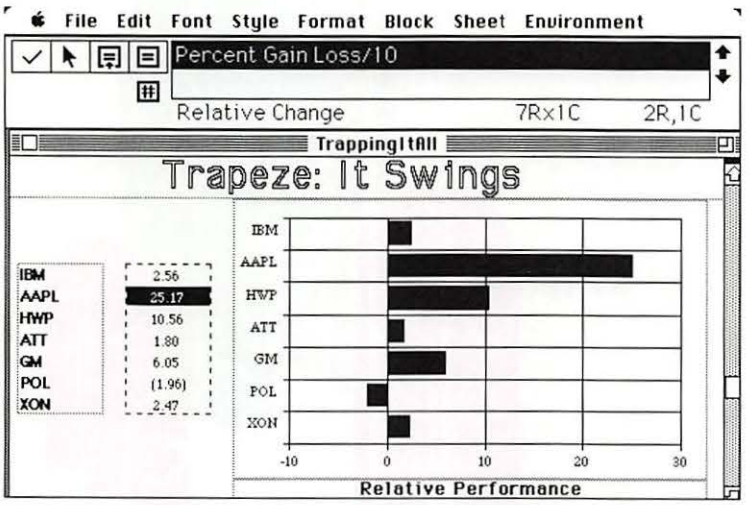



***Figure 4***
Trapeze *is actually a universal, all-purpose-everything program marketed as a spreadsheet.* Trapeze *employs user-defined blocks as spreadsheet elements—blocks can be text, charts, and pictures as well as numbers.* Trapeze *takes a while to master but offers significant possibilities in fancy presentation graphics and advanced types of calculation.*

### Trapeze: Spreadsheet Acrobat

And now for something completely different. *Trapeze* is so versatile that you could use it as a page-layout program for text and graphics only—never touching the spreadsheet facility—and be quite satisfied with it as a presentation design tool. In *Trapeze* you start with a blank page and define blocks of different types: text blocks, picture blocks for receiving *MacPaint* files, and spreadsheet blocks (see Figure 4). Text and numbers can be formatted, independently, through the full range of Mac options. Essentially, for calculations you create a set of linked, individually named mini-spreadsheets—income, expenses, sales tax, steam pressure, whatever categories you need. You then define formulas that reference each mini-spreadsheet block the way single cells are referenced in traditional spreadsheets. Chart blocks are defined in terms of number blocks. Database blocks, with their own special functions, can be charted and linked to number blocks.

Being a *Trapeze* user is something like owning a Citroën in Texas. It's the slickest thing around, it's full of nifty touches, but it's up to you to make it work every day. Beginners may find the blank-page start-up screen intimidating, but power-hungry users will revel in the huge function set and graphics possibilities. *Trapeze* at times seems more like an icon-based programming language with a graphics interface than a spreadsheet. You can design a standard 256 × 64 conventional spreadsheet in *Trapeze,* with "B13"-style cell labels, or for that matter you can create a 32,000 × 32,000 spreadsheet, with columns in 24-point Boston, and labels named after dwarf nebulae—it's your choice.

The price of this flexibility is that *Trapeze* only imports and exports WKS data files (no formulas), and it requires the special Trapeze Text Format to preserve

spreadsheet structure (layout and formulas) for export. Its highly efficient direct calls to the 68881 math coprocessor, however, mean that you'll probably want to leave such things as heavy-duty financial and engineering computations in *Trapeze* anyway.

### Big Business with Excel

In the bad old computer days a common saying was "No one ever got fired for buying IBM." In a Macintosh office, nobody has ever been fired for buying *Excel* (see Figure 5). In most respects it's the standard big-time spreadsheet, loaded with features and positioned at the center of a universe of *Excel* books, videotape self-study guides, macros-on-disk, and prepared templates for all purposes (several hundred from Heizer alone).

Its recalculation speed is, for some examples, an order of magnitude faster than *Works* or *Jazz*. *Excel* can link multiple spreadsheets and open multiple windows. As a good corporate citizen, *Excel* reads and writes WKS files with formulas, and naturally SYLK files as well. It takes a slow learner about ten minutes to produce impressive business graphics from an *Excel* spreadsheet. Comparison of sales figures suggests strongly that *Excel* is the de facto database of choice in Mac-based businesses, despite competition from a number of very good dedicated databases. It features a complete, relatively easy-to-use macro language, a long function list with particular attention to dates, and support for array calculations. *Excel*'s triumph has been so thorough that integrated software on a Mac has usually meant, in practice, *Excel* plus a word processor running under *Switcher* or MultiFinder.

On the downside, *Excel*'s in-sheet text-formatting capabilities are limited compared to *MacCalc*'s, and it lacks the battery of special scientific functions found in *Trapeze*. Another annoyance presents itself when you try to cut spreadsheet sections into *Word* while preserving the spreadsheet's columnar format. To accomplish this, *Excel* requires that you press the Shift key as you select Copy Picture from the Edit menu. Beginners, too, can feel overwhelmed by *Excel*'s large stock of facilities (its supplemental manual on Arrays, Functions, and Macros is nearly twice as long as the entire *MacCalc* main manual).

In practice, these are quibbles. *Works, Jazz, MacCalc,* and *Trapeze* fill the needs of particular sets of users, while *Excel* occupies the center of the business stage. Macro workarounds have been developed to handle most of the program's perceived deficiencies, and available template libraries include most common business calculations. *Excel* is not cheap, but it's difficult to find a spreadsheet-plus-chart-plus-macros program set that would save you money over *Excel*'s price while providing the same features.

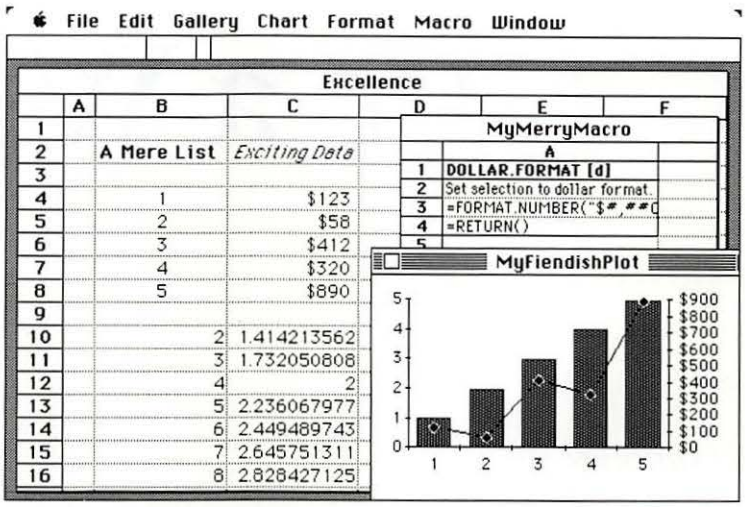
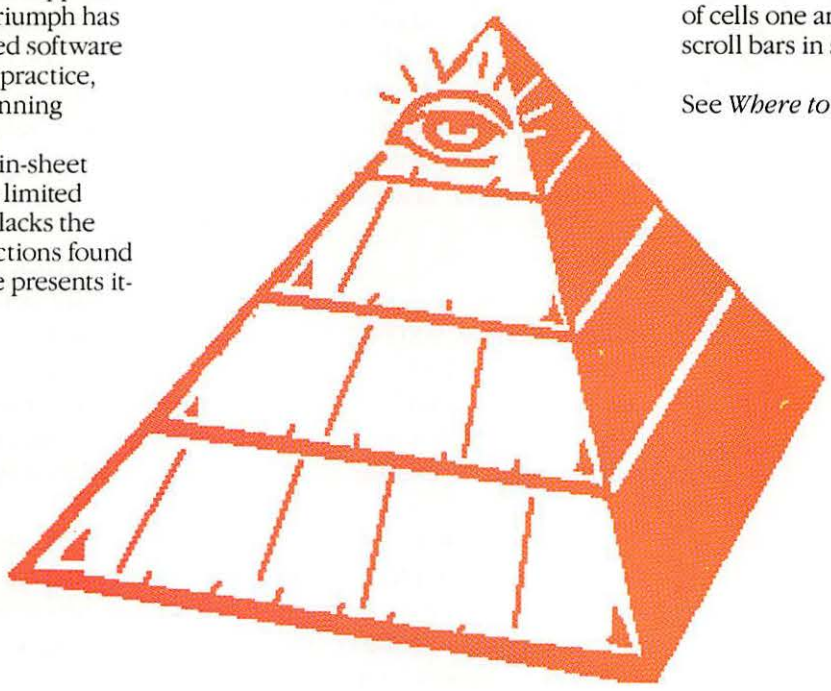



***Figure 5***
Excel *offers the standard spreadsheet functions, spreadsheet linking, simple text-formatting (bold, italic), and state-of-the-art recalculation speed. It also features an easy-to-use macro facility for automating simple and complex tasks. Completing the package is a set of superior charting capabilities.*

### Add Up Your Worksheet

For more detailed information, "The Point Spread" will help you match up your needs with specific programs. However, this sketchy version of a spreadsheet buyer's guide is surprisingly accurate. And be glad you're selecting a spreadsheet for the Mac—80 percent of the spreadsheet users in America are still navigating the sea of cells one arrow-step at a time, with no scroll bars in sight. □

See *Where to Buy* for product details.



# Be a Winner!

*Announcing the second annual*

WORLD-CLASS MACINTOSH CONTEST

*Macworld* is proud to offer you an opportunity to cast your vote for excellence in computing—and perhaps win the ultimate Macintosh hardware and software system. Last year's contest was so successful that we are inviting all of our readers to participate once again.

Usually we give you our opinions on the latest Mac products, but now, with the World-Class Macintosh Contest, we want to hear what *you* think. Which Mac products do you find significant? Which have served you well during the last year? Which would you recommend to a friend? By voting for the Mac products of your choice on the attached contest-entry form, you can both reward the hard work of your favorite product developers and help keep *Macworld*'s editorial coverage on track.

You also earn a chance to win hardware and software worth thousands of dollars. To show you our appreciation for taking the time to participate in this contest, we will pick three winners at random from among the World-Class entry forms. The lucky grand-prize winner will receive most of the top-voted hardware and software products. A copy of each winning software package will go to the runner-up, and the third-place winner will receive a selection of winning software programs.

Entries must be received no later than March 15, 1988; results will be announced in our September issue. To reflect readers' preferences accurately, we'll publish figures for all significant vote-getters in each category. The following explanations define product categories that are not self-evident, to help you cast your votes appropriately.

# 1988 World-Class Contest

Please use this entry form to vote for products you are familiar with and would recommend, based on their performance and value. Choose one product per category; you need not vote in all categories. Eligible products must be compatible with the Macintosh computer and commercially available as of February 1, 1988. **To ensure accuracy, we will not count a vote unless the following three items are provided: (1) correct product name, (2) manufacturer name, and (3) model number (for hardware only).** Version numbers of software products are not required. Please print or type your entry, and fill in your name and address on the back of this form. Entries must be received by March 15, 1988.

## HARDWARE

| | PRODUCT | MANUFACTURER/MODEL |
|---|---|---|
| Display–Black-and-White | | |
| Display–Color | | |
| Graphics Board | | |
| Communications Board | | |
| Hard Disk Drive | | |
| Alternate Mass Storage | | |
| Input Device | | |
| Macintosh CPU Upgrade | | |
| Modem | | |
| Digitizer/Scanner | | |
| Printer–Dot Matrix | | |
| Printer–Laser | | |
| Printer–Color | | |
| Plotter | | |
| Most Promising Newcomer | | |

## SOFTWARE

| | PRODUCT | MANUFACTURER |
|---|---|---|
| Word Processor | | |
| Spreadsheet | | |
| Database Management | | |
| Utility–Programming | | |
| Utility–Disk and File | | |
| Communications–General | | |
| Programming Language | | |
| Game | | |
| Integrated Product | | |
| Graphics–Business Presentation | | |
| Graphics–Paint/Draw/Animation | | |
| Graphics–CAD | | |
| Accounting | | |
| Desktop Publishing | | |
| Desk Accessory | | |
| Project Management | | |
| Outline Processing | | |
| Personal Management | | |
| Tax Planning/Preparation | | |
| Statistics/Math | | |
| Spelling Checker | | |
| Music | | |
| Micro-to-Mainframe Communications | | |
| File/Disk Server | | |
| Financial/Investment | | |
| Education/Training | | |
| Most Promising Newcomer | | |

# 1988 World-Class Macintosh Entry Form

Name _____

Company _____

Address _____

City _____ State _____

Zip _____ Phone _____

FOLD HERE

Place
stamp
here

**1988 World-Class Macintosh Contest**
Macworld
501 Second St.
San Francisco, CA 94107

## HARDWARE

**Display–Black-and-White** Monochrome or gray-scale monitors that serve either as a component of the Mac II or as an alternative to the standard display provided by other Macintosh systems.

**Graphics Board** Add-in boards that permit the Mac II to display color or gray-scale images.

**Communications Board** Add-in boards that help the Mac communicate with other Macs and other computers. Examples include Ethernet boards and 8086 and 80286 coprocessor boards.

**Alternate Mass Storage** All types of mass storage devices except hard disks. Examples include external floppy drives, removable cartridge drives, and tape backup units.

**Input Device** Mice, trackballs, graphics tablets, keyboards, joysticks–everything but digitizers and scanners.

**Macintosh CPU Upgrade** Products that increase the capability of Macs that come equipped with the 68000 microprocessor, by using either faster 68000s or 68881 and 68020 devices.

**Printer–Color** Any printing device, other than a dot matrix printer or plotter, that produces color output. Examples include thermal printers and ink-jet printers.

## SOFTWARE

**Utility–Disk and File** Programs that perform a wide variety of housekeeping chores, such as file conversion, file recovery, disk backup, and keyboard enhancement.

**Integrated Product** Products that include several applications–such as word processor, spreadsheet, charting program, and data manager–that share data and a command structure. The applications may be on one disk or in separate modules.

**Graphics–Business Presentation** Packages that produce or lay out pie, bar, or line charts; organizational charts; or other graphics used by business people to present information.

**Graphics–CAD** Computer-aided design includes two- and three-dimensional products used to input and edit geometry, especially for applications in mechanical, architectural, and electrical engineering.

**Accounting** A series or an integrated package rather than a single module (such as a ledger).

**Desk Accessory** Any program that installs under the Apple menu and doesn't fit in any other category. Examples include calculators, notepads, schedulers, calendars, and phone dialers.

**Project Management** Programs that manage resources and scheduling, usually for large, complicated tasks.

**Outline Processing** Stand-alone programs or desk accessories that organize ideas and notes in outline form.

**Personal Management** Programs that organize personal data or assist with personal finances, diet, exercise, or other matters.

**Micro-to-Mainframe Communications** Programs that perform terminal emulation and data conversion for mainframes and minicomputers.

**File/Disk Server** Devices that enable multiple network users to share one storage device.

**Financial/Investment** Programs that retrieve stock information, perform portfolio management, or assist in fundamental or technical analysis.

**Education/Training** Training programs that provide tutorials on such subjects as typing or computer applications. Education software includes courseware or examination-preparation programs.

## MOST PROMISING NEWCOMER

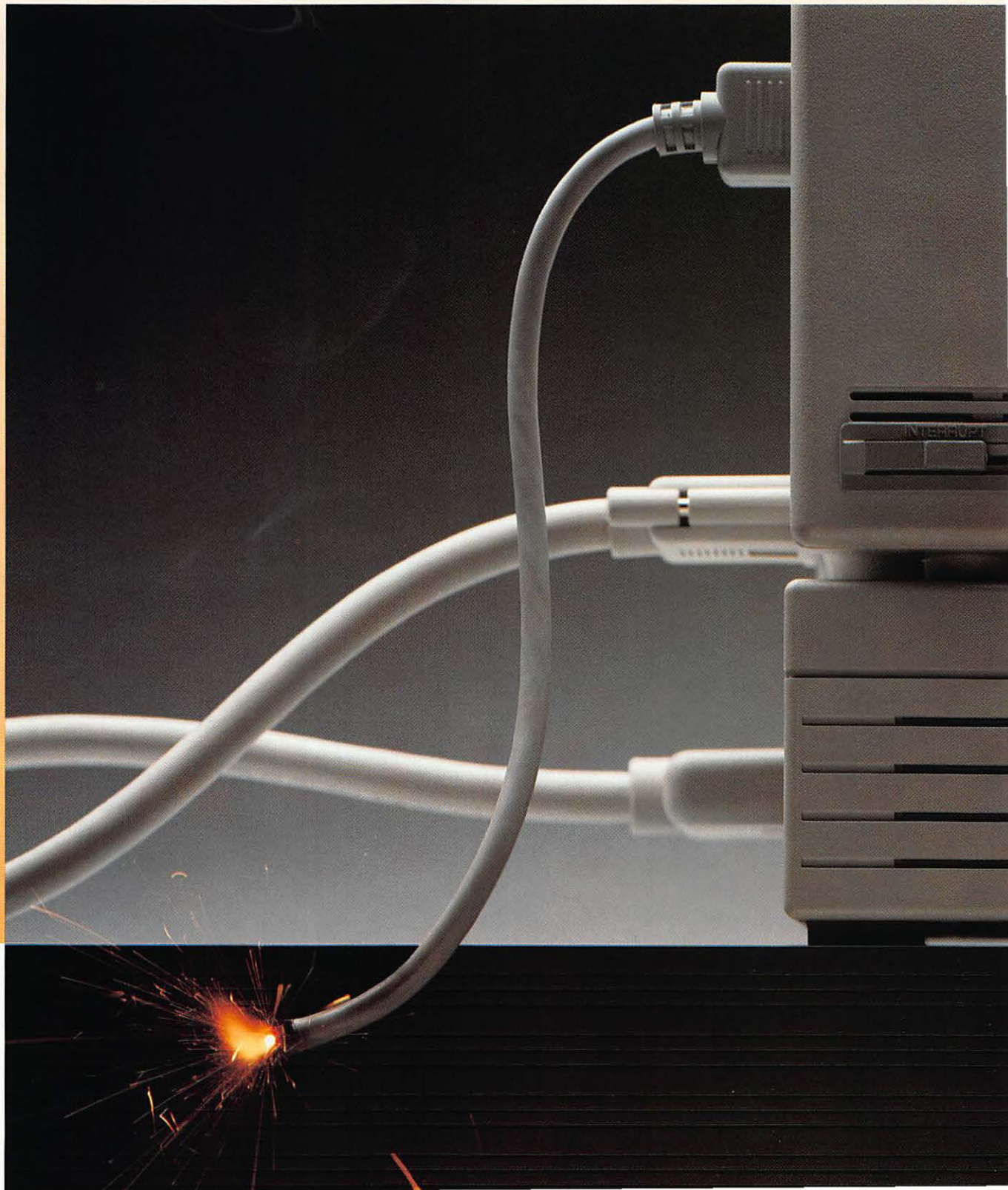
Which new products–in both the hardware and software categories–are making an impact? (You may vote for a product you've cited in another classification.) For our purposes, "new" products are those released within the last six months.

## CONTEST RULES

Each person may enter the contest only once. Entries must be printed by hand or typed on the form included in *Macworld* or on a reasonable facsimile. Your entry must include at least one product vote, plus your name, address, and daytime phone number (be sure to fill out the back of the form). Entries must be received no later than March 15, 1988. Employees of PCW Communications are not eligible. Please tape the form closed; *do not* staple the form. Thank you and good luck!

# Data Savers

*Peace of mind for under $100*
*—a survey of hard disk backup utilities*



*by Suzanne Stefanac*

We all know we should keep copies of important hard disk files, but most of us avoid thinking about it. Instead we gamble–at pretty poor odds.

Even if you never fall victim to a full-scale disk failure, your chances of suffering from missing or deranged data are good. And it always seems to happen at the worst possible time. When your Mac number finally comes up, Hamlet's slings-and-arrows soliloquy may suddenly sound like understatement. Unless, of course, you've recently backed up your hard disk.

Copying files as they are created is a laudable habit, but one few users learn. And buying a second hard disk, Bernoulli box, and tape drive is just too expensive an option for most people.

Hard disk backup utilities, on the other hand, sort and condense the contents of your files and quickly transfer the data to a set of floppies (or to another device, such as a network server, if you have one). Backups of subsequent changes, deletions, and additions to your documents become automatic affairs. And restoring the backed-up files yields a familiar desktop.

A bonus of using these utilities is that backed-up documents are restored to a reformatted hard disk in contiguous blocks, eliminating the fragmenting that plagues much-used hard disk files. Because it no longer has to scan for a file's scattered bits of information, a hard disk runs more efficiently after a full restoration.

### Global Backups

Most backup utilities offer three basic modes of operation. Global backups archive all the files on a hard disk. Incremental backups add any changes, additions, or deletions that have been made since the last backup. Selective backups enable you to choose particular folders and files for customized backups.

Global backups take the longest to perform. This procedure runs a bit faster if you choose options that exclude applications and the System Folder. Most users have these programs on disk already.

If you're backing up on new disks, they'll have to be formatted. To speed this process, some programs have an autoformat option. If you don't use it, you must go through the nuisance of explicitly telling the Mac to format each disk. After formatting a disk, all the programs reviewed ask if you want to verify the floppy's integrity. Verification usually doubles the backup time, but it's worthwhile when the data is crucial.

Finally, parameters set, the utility asks you to insert the first floppy. The program fills it, ejects it, and asks you for another and another until the contents of the hard disk are fully backed up.

### Incremental Backups

Periodic incremental backups keep track of new input to the hard disk. All backup utilities except *DiskFit* accomplish this by making new copies of any files that have been changed since the last backup or since a selected date. The new files don't replace previous versions; they're either appended to the original set of backup disks or simply saved as a new set. The advantage of this approach is that it archives all the old data. The disadvantage is that the set of backup floppies grows. And grows. *DiskFit* is unique in that it adds and deletes information within the original backup files.

When you back up files, most of the backup utilities create a directory file they use in performing incremental backups or restoring files. Should a directory file somehow be damaged or erased, the rest of the backup data could become useless. To avoid this disaster, some programs have an option that reconstructs the directory file from the data in the rest of the backup.

It is imperative that you number the set of backup disks carefully, since the program will ask for specific disks during incremental backups or restores. *Fastback* has an option for printing labels that clearly distinguish each disk in its backup set.

### Selective Backups

Selective backups are where the utilities' individual personalities come through. Some programs, like *HFS Backup* and *Omni Backup,* offer a full panoply of options that let you build a custom backup procedure that suits your working style. Besides offering the common options of specifying particular folders and files, these programs allow you to choose folders and files by name or partial name and by type (applications, documents, or System files).

*Hard Disk Backup* includes a feature that lets you key in the names of up to 21 files for exclusion.

### Restoring

If your hard disk falls on hard times and must be restored, all of the reviewed utilities provide for a complete transfer of information. All but *DiskFit* require that you restore the original global backup first and then the incremental changes; the altered files simply overwrite the original archive. Restoration takes about half the time of backing up.

Selective restore options are ideal if you need to bring back an erased or garbled file. Remember that a restored file will be the last version backed up, so restoring may cause you to revert to an earlier ver-

PHOTOGRAPH BY DAVID BISHOP

# Comparison Table

| | DiskFit 1.3 | DS Backup 3.0 | Fastback 1.01 | FlashBack 1.06 | Hard Disk Backup 2.0 | HD Backup 2.0 | HFS Backup 2.0 | Omni Backup 1.00 |
|---|---|---|---|---|---|---|---|---|
| **Size** | 171K | 70K | 161K | 19K | 100K | 24K | 76K | 101.5K |
| **List price** | 74.95[1] | $79.95 | $179.00 | $59.95 | $54.95 | $49.95[2] | $49.95 | $84.95 |
| **Compatibility** | | | | | | | | |
| Mac 512K and 512KE | ● | ● | ● | ● | ● | ● | ● | |
| Mac Plus | ● | ● | ● | ● | ● | ● | ● | ● |
| Mac SE | ● | ● | ● | ● | | ● | ● | ● |
| Mac II | ● | | ● | | | ● | ● | ● |
| **Backup from** | | | | | | | | |
| MFS hard disk | | ● | ● | | ● | ● | ● | ● |
| HFS hard disk | ● | ● | ● | ● | ● | ● | ● | ● |
| **Backup to** | | | | | | | | |
| 2nd hard disk | ● | ● | ● | ● | ● | ● | | ● |
| Hard disk cartridge | ● | ● | ● | ● | ● | ● | | ● |
| Bernoulli box | ● | ● | ● | | ● | ● | | ● |
| Tape drive | ● | ● | ● | | ● | ● | | ● |
| **Initial backup options** | | | | | | | | |
| Select folder(s) | ● | ● | ● | ● | ● | ● | ● | ● |
| Select file(s) | ● | ● | ● | | ● | ● | ● | ● |
| **Incremental backup** | | | | | | | | |
| Since last backup | ● | ● | ● | | ● | ● | ● | ● |
| Since set date | | | ● | ● | ● | | ● | ● |
| Within initial backup | ● | | | | | | | |
| **Selective backup** | | | | | | | | |
| By folder | | ● | ● | ● | ● | ● | ● | ● |
| By file(s) | ● | ● | ● | | ● | ● | ● | ● |
| By type | ● | | | | | | ● | ● |
| By name | | | | | | | ● | ● |
| **Restore** | | | | | | | | |
| Restore all | ● | ● | ● | ● | ● | ● | ● | ● |
| Restore all file(s) | ● | ● | ● | ● | ● | ● | ● | ● |
| Restore to floppies | ● | | ● | ● | ● | | ● | ● |
| Overwrite protect | | ● | ● | ● | ● | ● | ● | ● |
| **Options** | | | | | | | | |
| Autoformat | ● | ● | ● | ● | ● | ● | ● | ● |
| Verify | ● | ● | ● | ● | ● | ● | ● | ● |
| Estimate number floppies | ● | ● | ● | ● | ● | ● | ● | |
| Exclude applications | ● | ● | | ● | ● | | ● | ● |
| Save configuration | | ● | | ● | ● | | ● | ● |
| Text report | ● | ● | | ● | ● | | ● | ● |
| Help file | ● | ● | ● | | | | ● | |
| Back up 800K+ files | ● | ● | ● | ● | ● | ● | ● | ● |
| Recover directory | ● | ● | ● | | | | ● | ● |
| Reconstruct lost directory | ● | ● | | | | ● | | |
| Cancel during backup | | ● | ● | ● | ● | ● | ● | ● |
| Keyboard equivalent | ● | ● | ● | ● | ● | | ● | |
| Print labels | | | ● | | | | | |
| Time delay | | | | | | | | ● |

[1]Distributed free with DataFrame hard disks.
[2]Distributed free with Jasmine and Apple hard disks and the Mac II.

sion of a file than the one you lost. To protect against inadvertent reversion in cases where you haven't lost your entire disk, most utilities provide an overwrite protection option that prompts you each time it finds an existing version of a file the program wants to restore.

Because backup utilities transfer hard disk information to a single condensed file spread over the set of backed-up disks, documents are often split over more than one floppy. Splitting files allows the utilities to back up files larger than a single floppy can hold, but prevents you from opening files on the backup set without restoring them first. To address this limitation in cases where the hard disk may be absent for some reason (a trip to the shop, for example), most utilities have options that enable them to restore the data in Mac format directly to floppies.

*DiskFit* and *HD Backup* actually store the files in Macintosh format. Such backup files can be opened and copied just like any other documents, unless they are split across disks. Split files are a little more problematic. With *HD Backup* you must restore the file in question before opening it. *DiskFit,* however, allows you to cut and paste split files without restoration, by simply using the Join Files option.

**Restrictions**

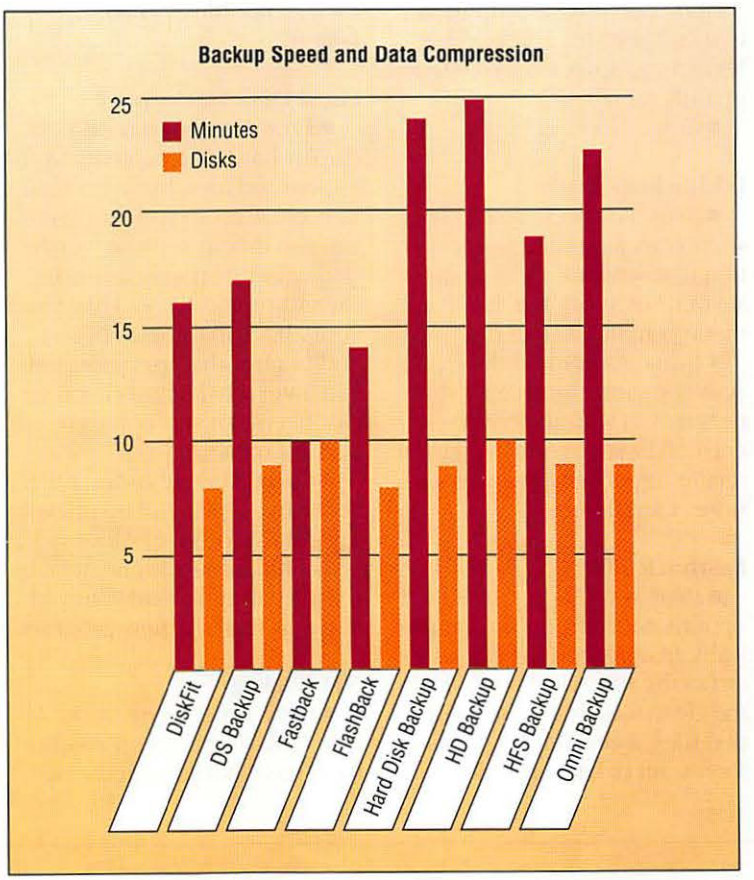
There are, of course, restrictions on what can be backed up and restored. Copy-protected applications that have been installed using a protection-breaking utility may not restore at all or may appear to be restored but still not function. Restricted-

## Backup Tryouts

To give the programs a test run, I used a Mac Plus with a 96K RAM cache to back up an Apple Hard Disk 20 containing 7042K in nonapplication documents. Dozens of text files, a feature-length film script, a variety of graphics documents, and several large mailing lists–one a file that logged in at 1009K–were all backed up in global backups. "Backup Speed and Data Compression" shows the results. (The figures in this graph provide only a relative measure of performance; actual performance depends on a variety of factors, such as the type of files on a disk and how fragmented it has become.)

To test the programs' incremental backup capacities, I added a new 200K file to the original collection, beefed up one file by about 60K, deleted a 175K file, and moved one folder into another. All the programs saved these changes, although different programs had different data-compression capabilities. *FlashBack, HFS Backup,* and *Omni Backup* required three disks for the incremental backup. *DS Backup, Fastback,* and *HD Backup* asked for two floppies. *Hard Disk Backup* used one, and *DiskFit,* because of its unique ability to make changes within the initial backup set, required no new disks.

I tested the programs' abilities to handle a file larger than a floppy disk could hold, by backing up and restoring the 1009K database file. None of the utilities had any problem with this task. In doing a complete restore to a newly formatted hard disk, only *DiskFit* returned all files to exactly the same position they held prior to erasure. But no utility lost a file, and all the programs retained folder organization.



# Backup Wrap-ups

**DiskFit 1.3 and Network DiskFit 1.3**

■ *Pros* The most straightforward of the backup software, *DiskFit* is the only utility besides *HD Backup* to store files in Macintosh format. This virtual volume concept is like having a hard disk on floppies. Files can be copied directly from the backup volume. Because changes are made right in the original files, *DiskFit* generates no stack of incremental disks, and there is no need to repeat global backups.

Version 1.3 runs 20 to 25 percent faster than the earlier 1.01, and you can back up in the background under MultiFinder. A Duplicate option allows fast transfer of information from one hard disk to another.

*Network DiskFit* is unusual in that it restores access privileges and allows a user to back up only files.

■ *Cons* None.

**DS Backup 3.0**

■ *Pros* Relatively quick. This version includes a Retrieve option that rebuilds a lost or destroyed directory file. Each menu contains a Help file.

■ *Cons* Although I did exactly the same things with this program as with the others, it crashed twice, requiring partial rerunning of backup and restore operations.

**Fastback 1.01**

■ *Pros* A walloping 161K of options and assurances. Graphically, from the crouching leopard in the first window through the clean folder and file selection tiles, a gem. Prints labels for the set of backup disks. Speedy because the proprietary floppy disk output routine allows the utility to write to floppy disks while reading data from the hard disk. For extra protection, *Fastback*'s error-correction codes automatically reconstruct up to 10 percent of the bad sectors on your backup disks.

■ *Cons* Pricey. Can't save backup configuration for future backups.

**FlashBack 1.6**

■ *Pros* Mighty Mouse of a utility. At only 19K, it manages to match the competition in efficiency and pace. Includes most of the necessary options. Graphics display crisp and efficient.

■ *Cons* Can select only folders, not files. No online help file.

**Hard Disk Backup 1.2**

■ *Pros* Options galore. Can display hard disk contents by folders and files, by name, date, size, creator, or type. Not only can you delete, rename, verify, or format any floppy, any time, the utility asks if you'd like to verify backup floppies before and/or after the operation. Lets you enter a wild-card character that filters out sets of files by parts of names.

■ *Cons* The publisher, FWB Software, says it will be phasing out this product. Version 1.2 is incompatible with 1.0, which means you can't read your old backups with the new program.

**HD Backup**

■ *Pros* Breezy operation. At only 24K, the program meets most basic backup needs. Because each incremental backup is done from the last global backup, you can reuse prior incremental disks—no disk buildup. Files are in Macintosh format and may be accessed normally.

■ *Cons* Backup options are limited to entire directory, changes, and single files. *HD Backup* will not copy backup data to floppies in an emergency (when your hard disk is on vacation).

**HFS Backup**

■ *Pros* Excellent value. A sturdy, versatile utility that allows for highly customized backups. *HFS Backup* filters by class, date, names, and parts of names. It displays folders hierarchically and files alphabetically, locates lost files, and gives the location of a moved file. By the makers of MacBottom.

■ *Cons* Backs up only to floppies.

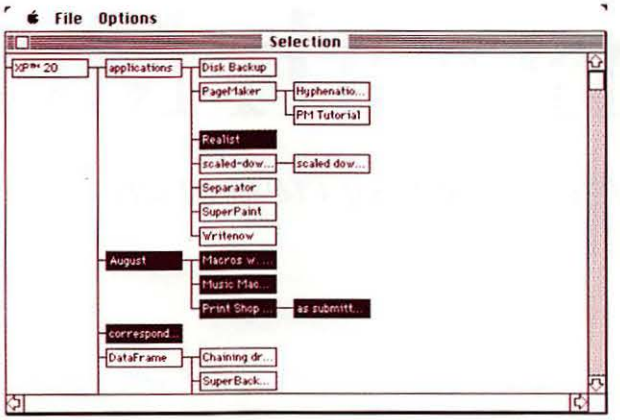
**Omni Backup**

■ *Pros* More options than any user could ever use. Will back up any Macintosh volume to any other. Opens with four stacked windows—Backup, Selection Criteria, Folders, and Files. The last two can be tiled to facilitate the selection process. When restoring to volumes other than floppies, you can set the automatic backup timer to work while you're away.

■ *Cons* Selective restore is more laborious than with most utilities, and the manual only confuses the issue. Has some problems with *TOPS*.

access files can be backed up and restored only by those cleared to read them.

Should you wish to restore the backup files to a newly initialized hard disk, you must force the hard disk to write boot blocks to its first two blocks (0 and 1). You must, in the words of the *HD Backup* manual, "Place a System/Finder unto the hard disk to make it self-booting." You may then restore applications and documents. Each utility has its own protocol for getting the boot blocks in the proper place, but it is a good idea to store a start-up disk containing your current System Folder and a copy of your hard disk backup utility with your set of backup disks. Most utilities allow you to exclude the System Folder from backup to save backup time and disk space and to facilitate full restores.




***FlashBack Folder-Selection Window***
FlashBack *displays a simple tree structure that allows you to click on the folders for backup or restoration. Lean but clear.*

### Networks

*Network DiskFit* is the only utility designed specifically for use with *AppleShare* and *TOPS* networks. Although any backup utility can back up whatever folders a user has access to on a server (as long as you're sure no one else will be accessing those files), only *Network DiskFit* restores ownership and access-privilege information. This program also allows workstation users to back up only files they have created, and it can be run under MultiFinder.

*Omni Backup* allows you to launch from any volume on a network and provides a timer to enable non-floppy backups during low-use hours.

### Backup Strategies

Defining a backup strategy that works for you is the secret to data security. With a backup utility residing on your desktop, you can whisk through an incremental or custom backup at the end of each working session. If your utility generates a growing pile of disks, you may want to do supplemental global backups monthly, or whenever the number of incremental disks matches the number of initial backup disks.

For particularly sensitive files, a second set of backup disks stored at another site is good insurance (remember those acts of God). In case your data disks are damaged, some programs can recreate all or part of the data using information in the directory files.

Backup time will be shorter if you have a SCSI hard disk. Using up to 96K in a RAM cache will generally hasten the process a bit; more than 96K can actually slow down the backup. Some utilities are designed to work with two disk drives at once. Keeping the number of files per folder to a minimum will quicken the pace, as will paying attention and promptly replacing ejected floppies. Defining individual backup configurations for particular sets of files allows you to accomplish mini-backups with a click of the mouse.

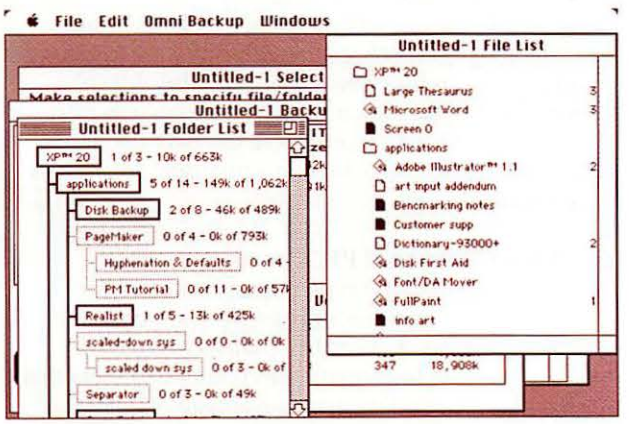
A few don'ts are in order to ensure that an attempted safety maneuver doesn't become a data disaster in its own right. Don't run any backup utilities except *DiskFit* 1.3 in a switching environment–the results will be, as one manual puts it, "unpredictable." Don't back up volumes on a network when someone else is accessing them or you may simply lose the files. And don't try to read or write to backup floppies that are not in Macintosh format, or once again, you could lose your data.

Remember that all floppies written to in the backup operation will be completely erased. Also, although verifying the floppies slows down the process, it is an important option for sensitive files, since it protects you from floppies with magnetic bits that have "sagged" from heat, dirt, or other forces.

### Backup Bottom Line

So which backup utility is the best? There are no lemons in this batch of programs, but different products will suit different individuals. Budget-conscious users, for instance, will appreciate the lean and remarkably inexpensive *FlashBack. HFS Backup* and *Omni Backup* enable you to customize backup procedures–an ability that should encourage backing up as a regular habit. *Fastback,* as the name implies, delivers the greatest speed–but at the greatest price by far. For my money, *DiskFit* and its cousin *Network DiskFit* are the products that stand out from the pack. Moderately priced and simple to run, they generate no growing pile of incremental backup disks; periodic global backups are unnecessary; and backed-up files are in easily accessible Mac format. □

See *Where to Buy* for product details.




***Omni Backup-Selection Window***
Omni Backup's *display window allows the Backup, Selection Criterion, Folder List, and File List to be stacked; or as shown, the folder and file lists can be tiled to facilitate selection.*

# Smooth Moves

## *The ins and outs of cutting and pasting graphics*

***by David Biedny***

It used to be that one of the most effective ways to impress someone first looking at the Macintosh was to copy a *MacPaint* picture effortlessly into *MacWrite.* Many early Macintoshes were sold on the strength of this seemingly fantastic trick, and rightfully so. No other personal computer had ever made transporting graphics from one program to another so convenient.

Software has come a long way since those early days, but sophistication exacts a price. Alongside the Mac's original bit-map format now stand new graphics formats like PICT, EPS, TIFF. These new standards bring more power to Mac artists and publishers, but also make compatibility between programs a thorny issue. Today, getting the results you want when moving graphics between programs requires care and planning. It also helps to have a basic understanding of how the Mac's main graphics standards work.

### Bit-Map Basics

The original Mac graphics format–still the lowest common denominator in Mac graphics–is the bit-mapped image. Bit-map programs such as *MacPaint* treat each page as a matrix of points; all points are either on or off, white or black. Bit-map programs work at a resolution of 72 dots per inch (dpi), which is the same resolution as the Mac screen and the ImageWriter printer. That means if you stick to an ImageWriter and use a bit-map program, what you see will always be what you get.

The big disadvantage of the bit-map system is that it can't readily take advantage of printers with a higher resolution than that of an ImageWriter. If you print a *MacPaint* file on a LaserWriter, for example, the 300-dpi LaserWriter simply lays down multiple dots (about 16) for every bit-map dot in the image, and the laser image maintains its chunky, bit-mapped look.

Some programs, such as *SuperPaint, GraphicWorks,* and *Canvas* (the powerful newcomer from Deneba Software), give you a workaround for this limitation, letting you create bit maps at higher resolutions than 72 dpi. *SuperPaint*'s LaserBits mode enables you to work on 300-dpi bit maps, *Canvas* offers five preset resolutions, and *GraphicWorks* lets you set any resolution you want.

The main problem with the *SuperPaint* solution is that to work on 300-dpi bit maps you must use 300-dpi tools. When you create a drawing in *SuperPaint*'s normal mode and then translate it to LaserBits, the program simply divides the standard 72-dpi dot by 4 vertically and 4 horizontally to yield a dot composed of 16 smaller dots; you now have a 300-dpi image that looks exactly the same as a 72-dpi image. To get the benefit of the higher resolution, you must edit the image in the FatBits-like LaserBits mode–one laser pixel at a time. This process is a lot like forking hay with the proverbial needle, and isn't recommended for large or complicated drawings.

*GraphicWorks* and *Canvas* take the opposite approach to increasing bit-map resolution. These programs enable you simply to map screen dots one-to-one to laser or Linotronic dots. This results in an overall reduction of the image; translating 72 dpi to 300 dpi, for example, yields about a 25 percent reduction (one-fourth the size of the original).

LaserTools, one of the utilities included with Knowledge Engineering's *JustText* software, processes bit-mapped graphics into PostScript. This doesn't change their appearance, but it enables you to rescale or rotate graphics with precision. *Canvas* also gives you the ability to rotate bit maps precisely, regardless of resolution.

### QuickDraw and PICT

The second major type of graphics is *object graphics.* Object graphics programs use mathematical expressions instead of explicit maps to define the lines, curves, circles, squares, and other elements that make up an image. The main advantage of object graphics is that images–or various parts of an image–can be resized, reshaped, moved, and otherwise ma-

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brisk 16 MHz.

Aside from the usual clean,
sign, the Deskpro 386's suggested co
cluded an EGA display and a 40MB hard
less storage and graphics seemed a waste of a
ting-edge computer (unless you plan to use it as a
file server, in which case you'd need more storage
and no graphics). Consequently, the PC's Limited,
Acer, and Kaypro machines all offer a 40MB model
as their lowest- capacity hard disk and an EGA dis-
play as standard equipment (except for the Kaypro
386E, which doesn't include a display in its base
price).

Compaq isn't known for having cut-rate prices,
so it's no surprise that the three clone makers sell
their 80386 machines for less. In the case of the
Acer 1100 and the PC's Limited 386[16], that's about
$3000 less when EGA capabilities and a 40MB
hard disk are nudged into each system.

What do you sacrifice for this monster sav-
ings? On close inspection, not much in the perfor-
mance category: The Deskpro 386's superior
speed on most of the National Software Testing
Labs (NSTL) benchmarks is due to the disk cach-
ing software that now comes with the machine.
Odds are that if PC's Limited, Acer, and Kaypro
bundled a disk caching program with their units,
the machines would exhibit comparable times. In
the *1-2-3* benchmark, which emphasizes process-
ing speed instead of disk access, the Deskpro 386
falls somewhere in the middle of the field.

The real trade-off involves an intangible:
The Deskpro 386 arrived glitch-

JEFFERY NEWBURY

nipulated much more freely than bit maps. This makes object programs easier to use for applications, such as architectural drawing or forms design, that mainly use regular shapes such as circles, squares, straight lines, and simple curves (*MacDraft* is an object-oriented program). Another plus is that object files usually take up less memory than bit maps.

Object-oriented programs can save or print graphics in different formats. The lingua franca of file formats for the object-oriented Mac graphics world is the PICT format, which Apple pioneered with *MacDraw.* Most graphics programs, including many PostScript programs, can save files in PICT format (although PostScript graphics saved in PICT won't include any special PostScript effects such as gradients or rotated text).

In many cases PICT is the only format useful for getting high-resolution graphics into databases, word processors, or other programs that don't support the EPS, TIFF, or PostScript format. When you bring PICT graphics into a desktop publishing program, you can rescale them at will, and lines and fill patterns print without distortion.

PICT files are actually composed of QuickDraw commands. QuickDraw is the language the Macintosh uses internally to define the appearance of virtually everything on the Mac screen; it's also the language that drives the ImageWriter printer and some new non-PostScript laser printers, such as General Computer's Personal Laser Printer (see "The QuickDraw Solution," *Macworld,* September 1987).

The Macintosh II uses QuickDraw II and PICT II, both of which have been enhanced for color and gray-scale graphics among other things. Because QuickDraw (unlike PostScript) makes use of the Mac's central processor to make calculations about graphics, using QuickDraw for high-quality color and other demanding applications severely slows down the Mac's operation. Some color animation and modeling software publishers report problems using QuickDraw II to drive color displays with more than 256 colors (8

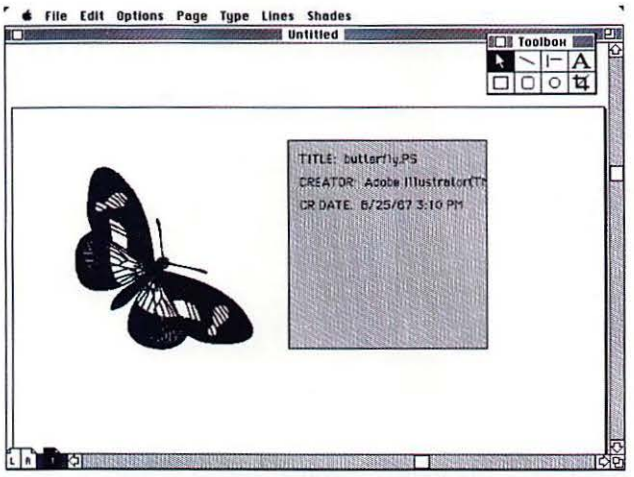



***Figure 1***
*The butterfly on the left was placed on a page as an EPS graphic. The box on the right is the same butterfly imported as PostScript. The box represents the outer boundaries of the graphic. Both images will print exactly the same.*

bits)–an important consideration in the development of the Mac II as an engineering workstation.

**The Power of PostScript**

The success of the Mac in desktop publishing–indeed the very existence of the desktop publishing industry–is attributable to two products crammed into the same box: the LaserWriter and its software smarts, PostScript. This marriage has been successful for Apple, and now even IBM has shown it knows a good thing when it sees one, adopting PostScript as the page-description standard for its line of laser printers. Hewlett-Packard, which has championed the DDL language in its laser printers, has also announced that it will support PostScript.

From the Mac perspective, PostScript is an alternate language to QuickDraw. PostScript, developed by Adobe, is a rich language, with over 250 commands devoted solely to manipulating graphics and text (by way of comparison, the C language has only about 20 commands). This wealth of commands gives PostScript programs access to a wide variety of special effects, plus the ability to control things like width of lines or darkness of gray shades very precisely.

But by far the most significant advantage of PostScript over QuickDraw is that a PostScript file always prints out at the highest resolution available on a given printer (providing the printer is PostScript compatible, of course). This capability, which enables Mac publishers to produce high-quality text and graphics on a phototypesetter, is called *device independence.*

Other advantages of PostScript have to do with its text-handling capabilities. Since PostScript treats text as a graphic object, PostScript programs enable you to do anything to text that you can do to graphics (such as shade it, fill it, or change the outline weight). And PostScript fonts consist of a single definition for the font outline, which is simply scaled to produce different font sizes. This system makes efficient use of disk space (or font server space, in the case of printers like the Varityper VT600 and the Linotronic typesetters).

A great way to familiarize yourself with PostScript is to take a look inside a PostScript graphic. To go behind the scenes of a PostScript file, simply hold down ⌘-F when you print a graphic; instead of sending the PostScript code to the printer, a text file containing the PostScript description of the print job will be saved in the same folder as the application program. You can then read or modify the PostScript text file using any text editor or word processor. To try this trick you must have the LaserWriter and LaserPrep files in the System Folder, and you must use the Chooser to select the LaserWriter option (whether or not you actually have a LaserWriter isn't important).

*Cricket Draw* is a good educational tool for learning PostScript. Besides the standard graphics portion of the program, *Cricket Draw* includes a PostScript programming environment that enables you to view artwork as PostScript and to edit it with a text editor. There's also an online PostScript glossary, with a list of most of the standard PostScript commands and the parameters associated with each.

**P.S.: EPS**

PostScript comes in two flavors: standard PostScript and encapsulated PostScript (EPS, or sometimes EPSF, with the *F* standing for *File*). Most programs that create PostScript files actually use QuickDraw, not PostScript, to display images on screen (the only exception so far being *Adobe Illustrator,* which includes a proprietary PostScript screen driver). When you move a standard PostScript file out of the program in which it was created and into another program, such as a page-makeup program, the second program can print the graphics file but won't have access to the original program's algorithms for mapping the graphic to QuickDraw. This results in a file that prints but doesn't show up on the screen (see Figure 1). Encapsulated PostScript is a PostScript file that includes a generic QuickDraw component that tells nonnative programs how to display the file.

EPS's screen-preview capability makes it the preferred format for moving PostScript art into programs such as *PageMaker* 2.0, *Quark XPress, ReadySetGo* 4.0, and *Scoop* (and probably any other layout program likely to appear in the near future). *Adobe Illustrator, Cricket Draw,* and *ImageStudio* all generate EPS, and you can expect future PostScript graphics programs to also support this standard.

It's worth noting that some programs, such as *LaserFX,* that claim to save files in EPS apparently don't create complete EPS, since their files won't display in other programs. Also be aware that programs that generate EPS don't necessarily read EPS objects created by other programs. For example, even though

# Tips

### Adobe Illustrator

■ An important undocumented *Illustrator* feature enables you to move *Illustrator* graphics into the Clipboard and paste them into the Scrapbook (simply copying and pasting *Illustrator* graphics into the Scrapbook doesn't work). This feature is useful for programs that don't accept PostScript graphics, since the end result is a QuickDraw file. Simply hold down the Option key while copying any *Illustrator* artwork. The printed graphic will have relatively smooth lines, but it won't include PostScript fill patterns or line-weight specifications made in *Illustrator*. Bezier curves also won't be as smooth as PostScript versions.

### Cricket Draw

■ When moving *Cricket Draw* graphics, be sure to save them as EPS instead of PICT files if possible, since *Cricket Draw*'s PICT save capability tends to be buggy. For the same reason, it's dangerous to move *Cricket Draw* graphics using one of the popular Scrapbook-like desk utilities (see "Smooth Movers")–especially when the graphics contain *Cricket Draw*'s special effects.

If you're moving a graphic to a program that doesn't accept EPS but does print PostScript, use the following technique. When you copy the graphic to the Clipboard or a scrapbook DA, hold down the Option key while copying; this creates a bit map for the screen while retaining the PostScript description for printing. This technique also saves time with programs that do accept EPS, since a complex, heavily shaded *Cricket Draw* graphic copied with this technique redraws instantly on the screen, while the standard QuickDraw screen description takes much longer.

### PageMaker

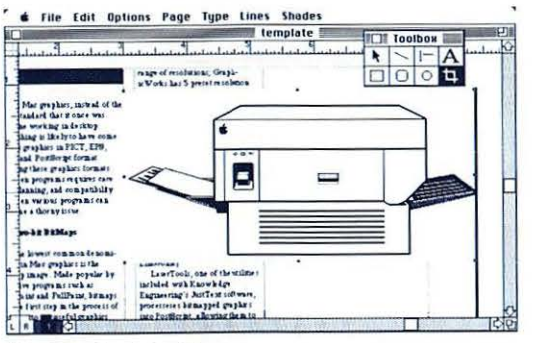
■ If you plan to run text around the edges of a graphic, always use *PageMaker*'s Place command, instead of a desk accessory like *Art Grabber* or *PictureBase,* when moving the graphic into *PageMaker*. The Place command gives the bit map a transparent background, while artwork brought in through the Clipboard with a DA has an opaque background that gets in the way of whatever is close to the graphic (see "Too Much of Nothing"). *Quark XPress* and *ReadySetGo* 4 don't have this problem.

■ You can increase the effective resolution of bit maps imported to *PageMaker,* in a manner similar to that of *GraphicWorks*' variable-resolution feature, simply by reducing the graphics. Since *PageMaker* doesn't have a numerical scaling function, getting the desired effect (such as an exact 72-dpi to 288-dpi reduction) is a matter of trial and error.

### LaserWriter Driver 4.0+

■ Apple has enhanced the LaserWriter driver to eliminate some of the problems desktop publishers and others used to run into. You can now print a negative version of an image directly to an acetate sheet, which your printer can strip up directly. You can also change the default page gutters, allowing the LaserWriter to print closer to the edges of the page.

The third new feature on the Page Setup dialog box requires a bit of explanation. The 96 percent reduction feature under the options menu is designed to eliminate problems that occur when printing bit-mapped graphics on the LaserWriter. Because 72 dpi doesn't go into 300 dpi evenly, when you print with the LaserWriter, it normally adds 2 extra dpi to make up the difference. Typically, this small amount of distortion is apparent only when you print large solid areas (have you ever noticed a wavy white line passing through black patches?) or use a program like *SuperPaint* to mix object graphics with bit maps in the same picture (in which case, elements may not align or abut properly). Ninety-six percent of 300 is 288, a number evenly divisible by 72.




***Too Much of Nothing***

*This bit-mapped graphic was brought into* PageMaker *through the Clipboard. Note how its opaque background covers the text, making it difficult to wrap the text around it manually.*

## Smooth Movers

■ *New Scrapbook 2.0* This shareware Scrapbook replacement differs substantially from the original Scrapbook in that it enables you to scale down graphics larger than the Scrapbook window for viewing and selecting, and *New Scrapbook* allows you to use a selection marquee to copy only portions of an entry (whether graphics or text). You can't save multiple scrapbook files, however.

■ *SmartScrap/Clipper* The best Scrapbook replacement, *SmartScrap* not only enables you to select any portion of an entry (as in *New Scrapbook* 2.0), it also builds a visual table of contents that shows reduced versions of each *SmartScrap* entry (any of which can be seen at actual size by double-clicking). You can also open multiple scrapbook or *SmartScrap* files.

*Clipper* is a Clipboard processor that enables you to measure and scale graphics numerically or crop them before pasting the Clipboard contents into a document.

■ *Graphidex* This program is a graphics cataloger, desk-accessory style. *Graphidex* is perfect for people like book publishers, who may need to call up a large number of graphics from within a page-makeup program. *Graphidex* also gives you facilities for rotating graphics by arbitrary amounts (though a PICT or object graphic will convert into a bit map if rotated in this fashion), flipping them horizontally and vertically, inverting them, and scaling them numerically.

■ *PictureBase* My favorite graphics cataloger is *PictureBase,* which consists of an application and an accompanying desk accessory. It handles bit-mapped or object/PICT graphics, creates a visual index of entries, allows entries to be scaled in 25 percent increments, allows any portion of an entry to be copied to the Clipboard, and has an extremely sophisticated search function.

■ *Art Roundup 1.1* The software, *Art Roundup,* included with the excellent *WetPaint* clip-art series, enables you to open and copy portions of or entire *MacPaint* files from within another program. It sports a lasso and an eraser, as well as horizontal and vertical flipping and inverting capabilities. Consider it a very capable replacement for *Art Grabber+* or *Artisto* (a shareware desk accessory with the exact functionality of *Art Grabber+*).

■ *Glue, SuperGlue, and Curator* With *Glue,* people who don't have the same programs can look at one another's graphics files. You could, for example, lay out a newsletter in *PageMaker,* take snapshots of the pages in *Glue,* and then modem the snapshots to a client who doesn't have *PageMaker* but does have the *Glue* Viewer program. *Glue* is really an alternate print driver that intercepts any program's print output and converts it into QuickDraw. Viewer also allows you to select any part of the *Glue* file and copy it to the Clipboard.

An update to *Glue, SuperGlue* includes the ability to specify the size of the print output. *SuperGlue* also includes a desk accessory that has all the functionality of the original Viewer application, including a Print command. *Glue* owners can upgrade for $40.

Solutions is releasing a new utility, called *The Curator,* which is similar in operation to *Glue,* with the added ability to directly read a number of different file formats, including *MacPaint, MacDraw,* PICT, PostScript, QuickDraw, TIFF, EPS, and, of course, *Glue. The Curator* also includes a pictorial table of contents (like *SmartScrap*'s).

*Illustrator* and *Cricket Draw* both create EPS files, neither can open EPS files created by the other.

### The Problem with PostScript

As powerful as PostScript is, it's not without problems. The most significant of these is printing speed. Consider the process involved in printing a PostScript page (see Figure 2):

■ The Macintosh screen image is translated into PostScript code (elegantly and transparently) by the LaserWriter driver file in the System Folder; the result is the straight text of a PostScript program.

■ The PostScript program is then sent out through AppleTalk to the LaserWriter or another PostScript printer.

■ Once in the printer, the PostScript program is executed by the PostScript interpreter in the printer's ROM (these ROM chips are responsible for the relatively higher cost of PostScript-equipped printers—along with Adobe's substantial licensing fee).

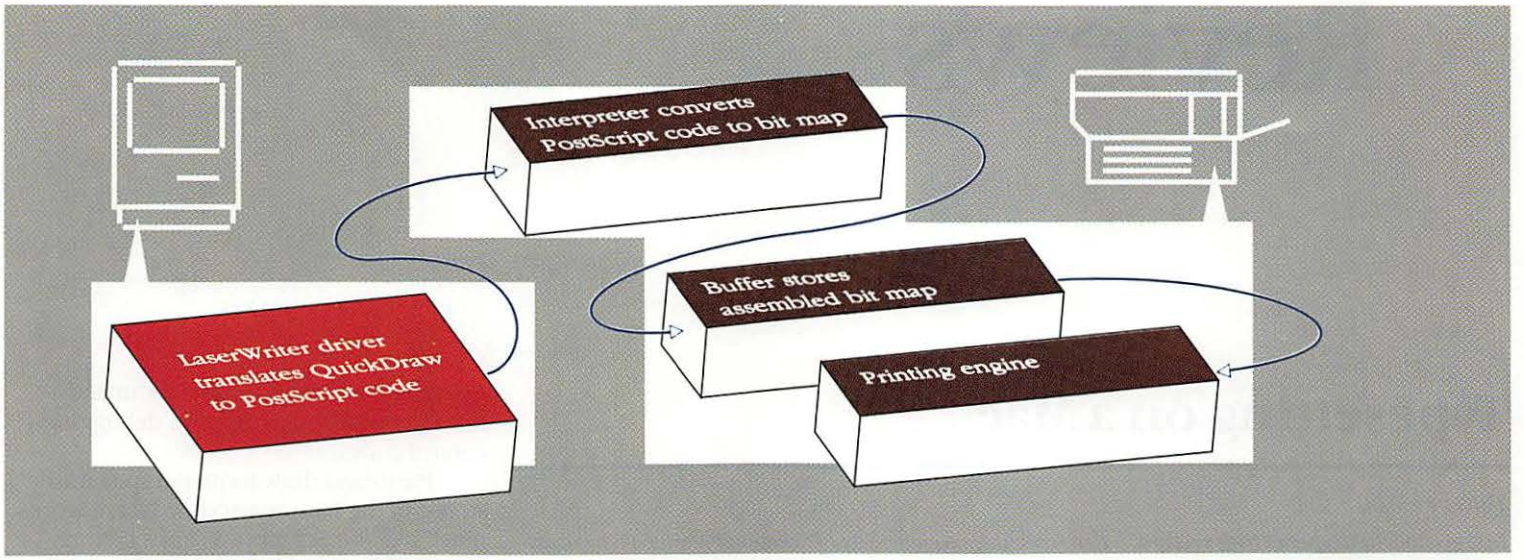



***Figure 2***
*The process of printing a PostScript page.*

■ The executed program is assembled in the printer's RAM into a high-resolution bit map of the entire page, and this digital image is shuffled off to the laser portion of the LaserWriter.

This complex process is the reason certain types of involved, graphics-laden pages can actually take hours to print out. Speed is an issue for anyone printing to a typesetting machine, since there is usually a charge for machine time. This issue is compounded if you want to create color separations on the Macintosh: depending on the complexity and size of the graphic, it may not be cost-effective to print four copies (one for each of the process colors) to a Linotronic.

The only way to resolve the speed problem is to beef up the hardware on the printer end, and this process has already begun. The Atlas controller (a hardware update that will begin to appear in some PostScript printers by the time that you read this) will bring to bear the power of the 68020 processor. Also, expect to see third-party LaserWriter accelerator boards begin to appear soon. (For more information on PostScript, see "The PostScript Difference" in *Macworld,* January 1988, and "Getting Started with PostScript" in December 1987.)

**TIFF**

The proliferation of high-resolution scanners for the Mac has created the need for a standard for handling scanned graphics. TIFF (Tagged-Image File Format) was developed by Aldus and allows scanned graphics with gray-scale information to be moved into a page-layout program and printed as smooth, halftoned images. Supported by *PageMaker* 2.0, *Quark XPress* 1.1, *ReadySetGo* 4.0, and most other page-layout programs entering the market (with the notable exception of *Scoop* 1), TIFF will most likely emerge as the scanner standard.

One could edit TIFF files with programs such as *SuperPaint* (the scanner software must support the *SuperPaint* file format) or *GraphicWorks* 1.1, but all the previously mentioned difficulties of editing 300-dpi files apply with a vengeance to editing high-resolution scans. To date, the best editing environment for TIFF images is Letraset's *ImageStudio,* a sophisticated product that was created for the specific purpose of editing scanned images. (For more information on TIFF and scanned images see "Shades of Gray" in *Macworld,* January 1988.)

**Drawing to a Close**

The flow of new Macintosh graphics products gets heavier every day, and while some might think that the market is beginning to get crowded, there's plenty of room for new, exotic ways to create artwork—whether in bit-mapped, PICT, PostScript, or some graphics format that hasn't been devised yet. It's easy to get confused and lose your way in the jungle of formats and standards, but with good planning and a clear idea of the desired end product, the hunting can be enjoyable. □

# Reviews

## Typesetting on a Mac

***TeXtures** 1.0*

***Integrated TeX typesetting system.*** ***Pros:*** *Includes complete set of Computer Modern typefaces; works comfortably in 1MB of RAM; page-preview magnifying glass for easy inspection of details.* ***Cons:*** *Awkward handling of font, format, and DVI files; Computer Modern typeface family not in PostScript form; requires knowledge of TeX typesetting language.* ***List price:*** *$495.* ***Requires:*** *512K.* ***Copy protection:*** *None.*

While programs like *PageMaker* and *Quark XPress* focus on page layout or page makeup, another important but less well known branch of desktop publishing comprises several markup-language typesetting programs for the Macintosh; one of them is Addison-Wesley's *TeXtures*.

Like FTL Systems' *MacTeX,* its major competitor, *TeXtures* is an implementation of Donald Knuth's document-typesetting system TeX. Whereas page-makeup programs are especially well suited to the creation of newspapers, newsletters, and other patchwork publications, and sidestep the chore of learning and entering codes, TeX's strengths lie elsewhere–it achieves true book quality and deals with book-length typesetting for documents that are heavily cross-referenced, are frequently revised, contain mathematical symbols and equations, or are generated from information in a database.

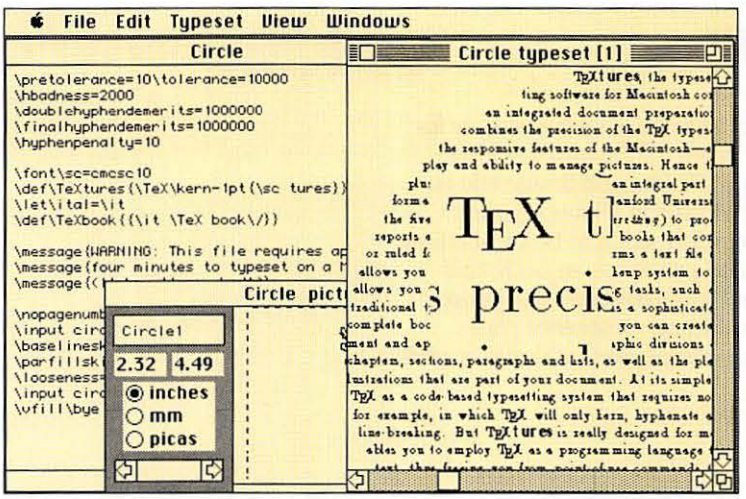
There are several reasons why TeX, and by extension *TeXtures,* excels in these and other publishing tasks. One is that TeX is highly programmable, so it's possible to automate a variety of tasks (such as compiling an index). Another is TeX's innate typesetting abilities, including the ease with which it aligns tabular material and the way it breaks lines of text according to the needs of the paragraph as a whole, not line by line. A third reason is the way TeX automatically handles kerning pairs and *ligatures* (joined pairs of letters such as *fi* and *fl*). And finally, there is TeX's mathematical typesetting prowess, which is considered by many to be the best of any typesetting language anywhere.

### TeX on a Mac

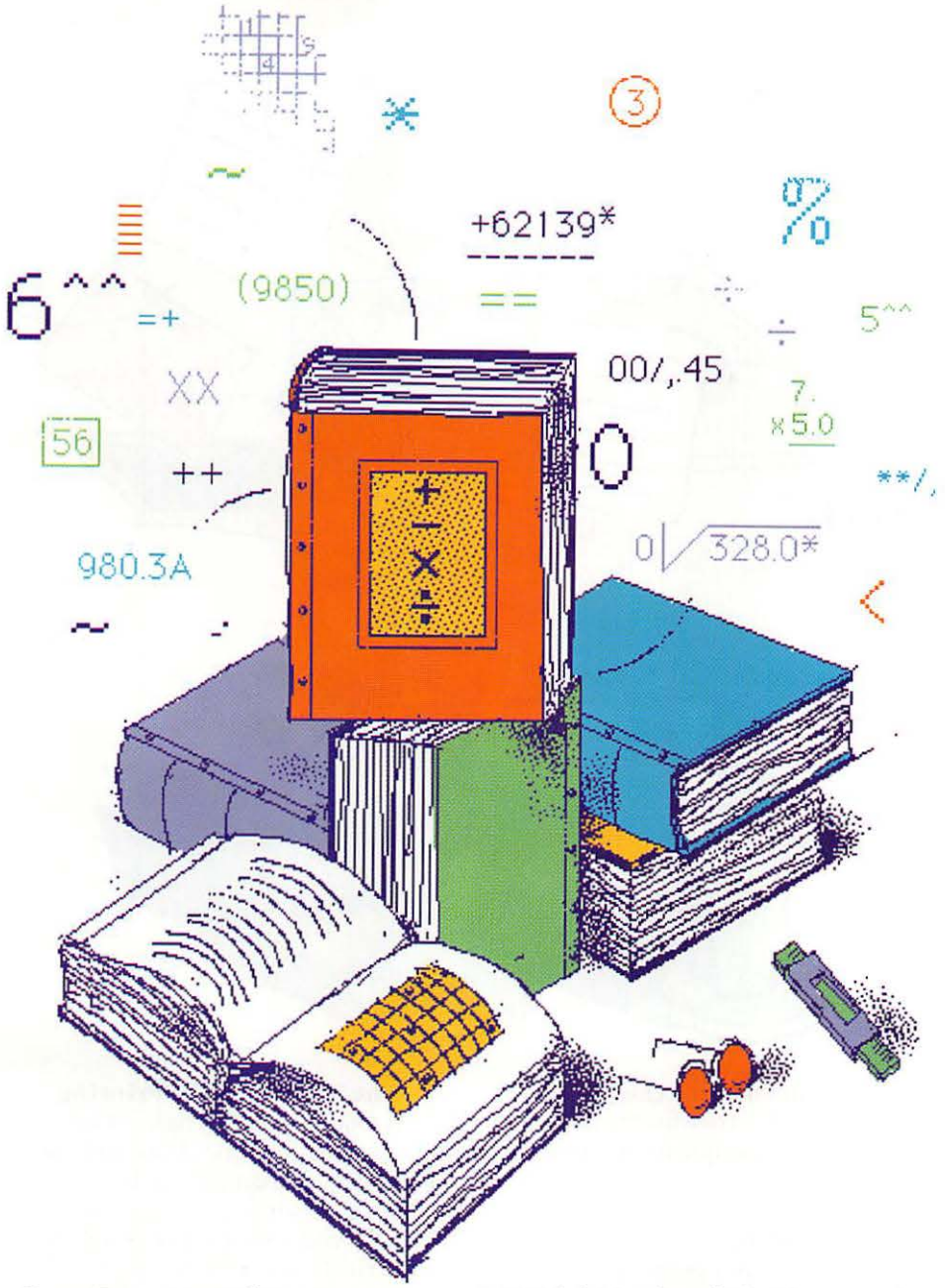
Every *TeXtures* document is composed of three parts, each displayed in a different window. The Text window contains text and control codes, and functions as a simple text editor. It employs the standard Macintosh mouse-and-keyboard editing techniques, as well as *TeXture*'s own Find and Change commands. Other features include a Wrap command that turns word wrap on and off, a line indent command, and a Go to Line #... command that's especially useful when debugging control codes.

Paint- and draw-format graphics are stored in the Picture window, which works much like the Scrapbook. Each picture must be identified by a one-word name–an arbitrary and unnecessary restriction. To help you place the graphic in your document, the Picture window displays the dimensions of the image currently in view. Once pasted into the Picture window, however, images cannot be altered (although they can be scaled during the typesetting process).

A screen rendition of the final typeset document is displayed in the Typeset window. (PostScript graphics, which must be stored in the Text window or as separate files, are rendered only if they are in EPS format.) Only one page is visible at a time, but you can view the page in reduced size or at virtually any magnification up to 500 percent (see "TeXnical Desktop Publishing"). If you have a number of documents open at one time, the Window menu helps you locate specific windows. It is organized by window type, however, not by document, which makes uncovering the three windows of a given document less than convenient.




***TeXnical Desktop Publishing***
*In* TeXtures' *Typeset window, you can use the pointer like a magnifying glass to enlarge typesetting details.*




**Logs, Formats, and Fonts**

The TeX Log window keeps you apprised of the actual typesetting process: the line number *TeXtures* is working on, the number of pages completed so far, and any error messages. If a serious error stops the presses, you can correct it in the TeX Log window or click on the Quit button to terminate typesetting and go directly to the problem line in the Text window. A Help button offers advice on correcting common coding errors.

Every typeset document is based on a specific format. *TeXtures'* default format, and the only one included in the *TeXtures* package, is Plain TeX. You can add others–either separately available formats such as LaTeX (which is bundled with *MacTeX*), or formats of your own devising–to the Typeset menu once *TeXtures* is running, but there is no way to launch *TeXtures* automatically with a preselected combination of formats.

*TeXtures* comes with a complete set of Knuth's Computer Modern typeface families. They are in bit-map format and thus print well in only a few sizes on ImageWriter and LaserWriter printers. PostScript fonts can be used with *TeXtures* in any size on any PostScript-compatible printer, but only if the corresponding TeX metrics file is available. The only TeX metrics files included in the *TeXtures* package are those for Computer Modern and fonts resident in the LaserWriter Plus; if you want to use other PostScript fonts, you must first obtain the corresponding TeX metrics files. You can add fonts (other than those already available in the System and TeX Fonts files) as you work, but, as with formats, there is no way to launch *TeXtures* with a preselected combination of fonts from a variety of files.

**Appropriate TeXnology?**

Despite its many improvements over mainframe and PC-compatible TeX versions, *TeXtures* is not without its shortcomings. PostScript fonts that are not resident in your printer, for example, must be manually downloaded before printing. Many special characters that Macintosh owners are accustomed to typing from the keyboard must be specified with codes (\"o for ö, for example). And to open or save a DVI (device independent) file from or for another TeX system, such as a Sun or a VAX, you must use a special desk accessory rather than invoke a simple command.

Unlike with *MacTeX,* a print spooler is not included with *TeXtures.* While *TeXtures* can work comfortably within the confines of a single megabyte of RAM, the Computer Modern font family requires over 3MB of disk space. And although the *TeXtures* package includes Knuth's indispensable (and humorous) *The TeXbook,* this user's guide falls short of explaining everything you need to know about the program itself.

*TeXtures* is to desktop publishing programs what *Adobe Illustrator* is to graphics programs: exceptional in its abilities, but clearly not for everyone. Mainframe TeXnicians will no doubt feel that its benefits far outweigh its flaws. And while experienced Macintosh users may be annoyed at the program's occasional lapses, if they need the power of desktop typesetting, *TeXtures* is a good choice in a narrow field.–*Robert C. Eckhardt*

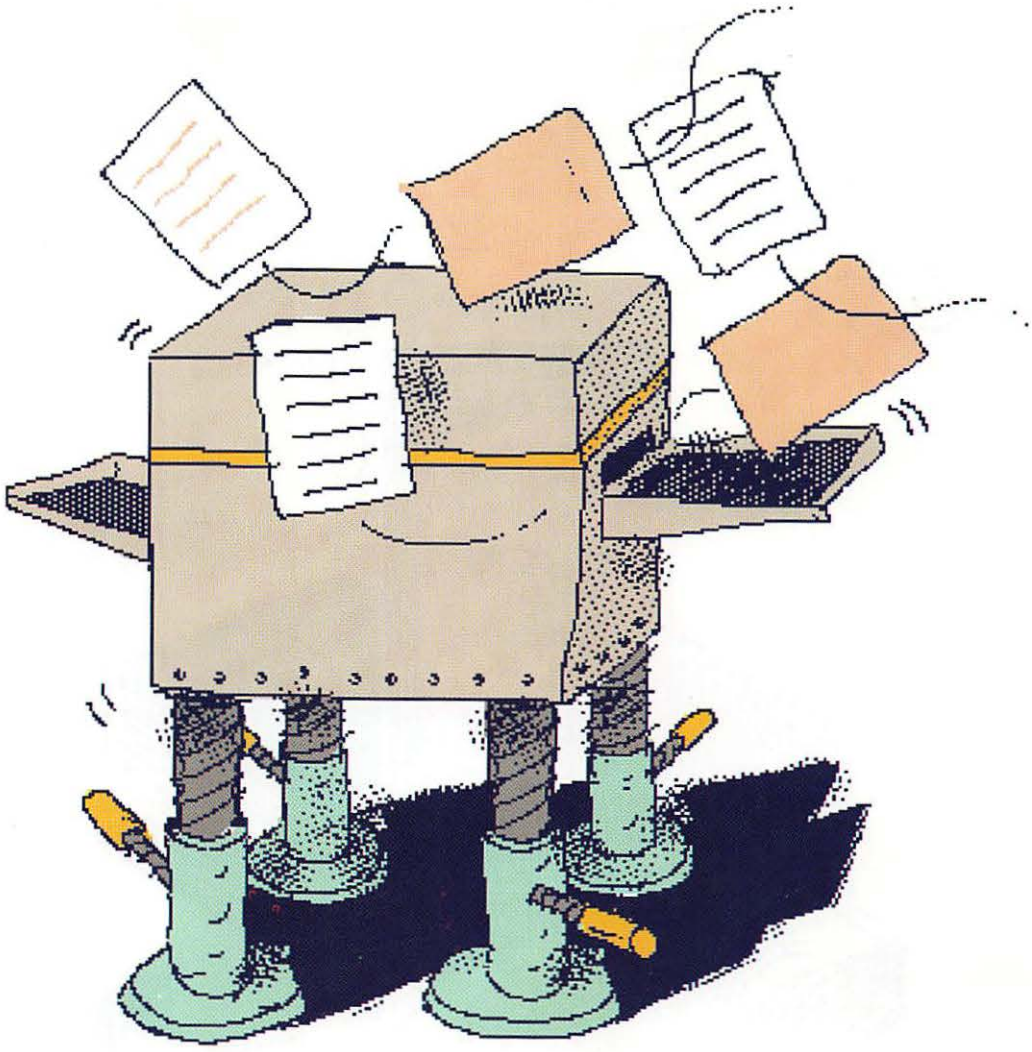
See *Where to Buy* for product details.

ILLUSTRATIONS BY MARK ULRICH

# Big Deal

***ScripTEN***

***PostScript Laser Printer.*** ***Pros:*** *1.5 MB more memory, longer duty cycle, and darker output than LaserWriter Plus; reduced maintenance schedule; HP emulation.* ***Cons:*** *No in-progress status display; inconveniently placed emulation-mode knob.* ***List price:*** *$5295 (3MB model).* ***Requires:*** *128K and AppleTalk or compatible connector and cable.*



Like other second-generation LaserWriter Plus-compatible printers, Qume's ScripTEN boasts lower prices and beefier hardware. Although its basic specs—300-dots-per-inch (dpi) resolution, an eight-pages-per-minute engine, and 35 built-in fonts—are the same, Qume's printer outpowers the LaserWriter Plus with 3 megabytes of RAM, a longer duty cycle, HP LaserJet Plus compatibility, and a white-write laser engine for dense, high-quality printouts. And all this for $500 less than the Apple machine's list price.

### It Ain't Heavy, It's My Printer

As its heavier-duty reputation implies, the nearly cubical ScripTEN, weighing in at about 90 pounds, is more massive than most of the competition. Several components—including the photosensitive drum, a collecting bottle for spent toner, and the toner hopper and cartridge—are user-installed. Although some steps in the assembly require a delicate touch, I was able to complete the process without a hitch in about 20 minutes, by working from a set of well-illustrated instructions.

The ScripTEN requires less frequent maintenance than the LaserWriter, but you won't save money on consumables. The LaserWriter's Canon engine needs a new $95 drum-and-toner assembly every 3000 pages. The ScripTEN's $60 toner cartridge is a separate unit and holds enough powder to print 5000 pages. However, you'll have to replace the drum every 30,000 sheets and it costs $590.

By comparison, the Texas Instruments OmniLaser is less expensive to operate, since it gets 6000 pages from a $79 toner cartridge and 20,000 pages from every $179 belt (the equivalent of the drum). The ScripTEN features a 5000-pages-per-month duty cycle, better than the LaserWriter's 3000 but only a third of what the more expensive Texas Instruments machine can endure.

### Compatibility

Some recent laser printers seem to emulate every printer ever made, but Qume stuck to the essentials for the ScripTEN's compatibility modes. A PostScript interpreter makes the machine functionally equivalent to the LaserWriter; ScripTEN's LaserJet Plus mode takes care of nearly every piece of MS-DOS-compatible software. For the rare program that doesn't support one of these two machines, the printer can also accept plain ASCII text.

On the hardware side, the ScripTEN provides Appletalk, RS-232C serial, and Centronics parallel connectors—enough for any mix of computers. You select the port that's active, as well as the emulation and communications modes, via a single multi-position rotary knob that's easy to turn but inconveniently mounted on the back of the printer.

### The Proof Is in the Printing

A total of six status lights (LEDs) on the top of the machine clearly indicate various error conditions, such as a jammed paper path or an empty toner cartridge. These are nice enough, but I sorely missed a readout of the currently active mode. Inexplicably lacking as well is a light that flashes when the printer is receiving data, making troubleshooting more complicated than it has to be.

When it comes to output quality, however, you won't be disappointed. As with other white-writing lasers, the blacks of your text and graphics are darker and bolder than you'll get with a LaserWriter or other write-black machine. Although some have complained that write-white laser engines tend to blur text in small point sizes, I found that even the 6-point *a, e,* and *o* were sharp and distinct.

The ScripTEN improves upon the LaserWriter with several subtle but appreci-

ated operational enhancements. The paper tray holds up to 250 sheets of 20-pound bond (to the LaserWriter's 100), and printed pages are conveniently delivered in a recess on the top of the machine in the order they are input. There's also a manual sheet-feed mechanism that, for example, makes it easy to print an occasional page on letterhead.

With the ScripTEN's generous complement of RAM, its improved duty cycle, and its high-quality output, Qume has built a PostScript printer that simply outpaces the LaserWriter Plus and saves you money to boot. You'll find other good values in this crammed marketplace, but the ScripTEN is definitely a laser printer to be reckoned with.—*Steve Cummings*

See *Where to Buy* for product details.

# RAID on a Disk

***TMON** 2.8*

***Program debugging facility.*** ***Pros:*** *Easier to use than* MACSBug; *huge list of helpful features; now supports 68020 and large screens.* ***Cons:*** *None (it's essential for serious programming).* ***List price:*** *$149.95.* ***Requires:*** *512K.* ***Copy protection:*** *None.*

A debugger is a special program that can survive a system crash and provide a picture of events in the computer's registers and RAM as the crash occurred, something like the black-box recorder on aircraft. The debugger hides in the background while a program is running and appears with a report when a crash happens; it can also be invoked to examine program workings at the machine level during normal operation. By examining the last instructions executed immediately before the crash, a programmer can identify the piece of program code that called up the dreaded bomb.

*MACSBug* (*Motorola Advanced Computing Systems Debugger*) is probably the most widely available Macintosh debugger; it's bundled with languages like *LightspeedC* and *Turbo Pascal*. In spite of that, the debugger of choice for Macintosh programming is *TMON* from ICOM Simulations.

The latest version (2.8) is still recognizably *TMON*, but new features make up almost 30 percent of the program. Upgrade items include 68020 support and support for nearly all varieties of large screens (a tricky programming area). Also new in version 2.8 are movable/scrollable/resizable windows, support for the SE/II Reset key (the mystery key at the top of the new keyboards), a calculator for hex arithmetic, and a function for restarting "frozen" mice.

**Programmer's Helper**

Programmers need all the help they can get in navigating the Macintosh's complex operating system. *TMON*'s value lies in its generous list of features for providing help on all fronts. The *TMON* command bar has menu items for: inspecting a memory dump with an arbitrary starting address, looking at disassembled code for any part of a program, setting breakpoints anywhere in a program, checking the data/address registers, checking the application and system heap zones, examining resource file contents, single-stepping through the program (skipping subroutine calls if you like), resetting monitor functions to your taste, performing hex arithmetic on addresses (Num), creating your own functions and saving them in named user areas, and finally, printing screen dumps of the monitor information to an ImageWriter. Menu items may be clicked with the mouse or called as *⌘-first letter*, except for the helpful "mouse unfreeze," which is necessarily ⌘-M.

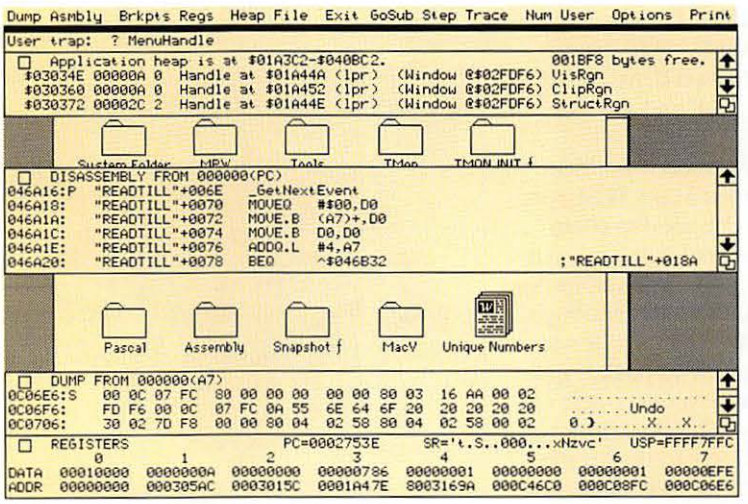
As if this weren't enough, *TMON* provides a manual written at the level of the best books in this area (for example, Scott Knaster's *How to Write Macintosh Software* [Hayden, 1986]). Besides a nice display of the trench humor that seems to be part of serious Mac programming, the manual gives a good introduction to debugging in general.

The accompanying figure (see "Anatomy of a Disaster") shows *TMON*'s special menu bar, which takes over when the system crashes or the programmer's reset is pressed. The program being studied is a graphics example taken from *Turbo Pascal* and rewritten in C with a few crucial mistakes. You can accomplish many of these functions in *MACSBug*, using the cryptic *MACSBug* two-letter command set, but there's no competing with *TMON*'s Mac-like menus for ease of use, especially for unraveling Toolbox snarls.

Since much of Mac programming consists of chaining together system functions, *TMON*'s facilities for flagging calls (known as *$A traps*) to the ROM Toolbox during program execution, and recording a history of these calls, is particularly helpful in explaining system crashes that don't appear to arise from the programmer's own efforts. The only area in which *TMON* might stand enhancement is its disassembler; serious programmers may want to pick the $30 shareware program *MacNosy* to fill in this gap.

ICOM Simulations, admirably, has upgraded *TMON* as if it were being chased by a pack of rivals, when in fact it's really the only program of its kind. It's hard to imagine anyone undertaking commercial or scientific programming without a copy of this excellent product.—*Charles Seiter*

See *Where to Buy* for product details.




***Anatomy of a Disaster***

TMON's *facilities for studying a system crash include a disassembler, user-specified memory dumps, a register, and trap tracing.*

# Foreign Interpreters for Hire

### *DaynaFile*

***MS-DOS floppy disk drives.*** ***Pros:*** *Easy to use and install.* ***Cons:*** *Expensive.* ***List price:*** *5¼-inch 360K single drive $595, 5¼-inch 360K and 3½-inch 720K double drive $849, other configurations $595 to $1029;* MacLink Plus *(OEM version) $95.* ***Requires:*** *512KE.*

### *Apple PC 5.25 Drive*

***MS-DOS floppy disk drive.*** ***Pros:*** *Inexpensive.* ***Cons:*** *Uses the expansion slot, supports only one disk format (5¼-inch 360K).* ***List price:*** *$399.* ***Requires:*** *SE or Mac II.*

If you've been the odd one out at your IBM-dominated office, two new MS-DOS floppy disk drives from Apple and Dayna Communications will quiet those IBM skeptics once they've seen how easily you can load and run a Lotus *1-2-3* or a *dBase III* file stored on the 5¼-inch IBM-compatible floppy drive on your Macintosh. But look closely before you buy one of these drives. Look closely, because you'll find some major design differences between them.

### DaynaFile

DaynaFile is available in either single- or double-drive configurations. You can choose a 5¼-inch 360K drive, a 3½-inch 720K drive, or a 5¼-inch 1.4MB drive that can also read a 5¼-inch 1.2MB disk. For example, you could order a 5¼ 360K single drive, or you could get a two-drive unit that handles both 5¼-inch 360K and 3½-inch 720K disks.

Installation involves merely connecting the drive cable to your Mac's SCSI port. A second SCSI port can be used to chain the DaynaFile to an external hard disk. An external power supply plugs into the back of the drive with a cord that's long enough to keep the power supply out of your way—a helpful feature, as the power pack is quite bulky. However, DaynaFile has a couple of minor flaws. Since it must be on before you start up the Mac, you'll have to restart the Mac if you forget to turn the DaynaFile on first. And because there's no power status light to remind you the machine's on, it's easy to leave the DaynaFile on accidentally all day (or all night).

Once you've connected the drive, you must copy the DaynaFile device driver into your System Folder. This step takes no more than a minute, and it only has to be done once. When you start up, a PC disk icon appears on the desktop if a disk is in the drive. Clicking on the icon displays the files, and subdirectories appear as folders that can be opened and read exactly like native Mac folders.

Dayna Communications sells an OEM version of *MacLink Plus,* file-conversion software that supports virtually every type of popular PC file format, including *WordStar, MultiMate, Microsoft Word, 1-2-3, dBase,* and DCA (document content architecture) files. But you can just as easily use the off-the-shelf version of *MacLink Plus.* DaynaFile also supports *Apple File Exchange.*

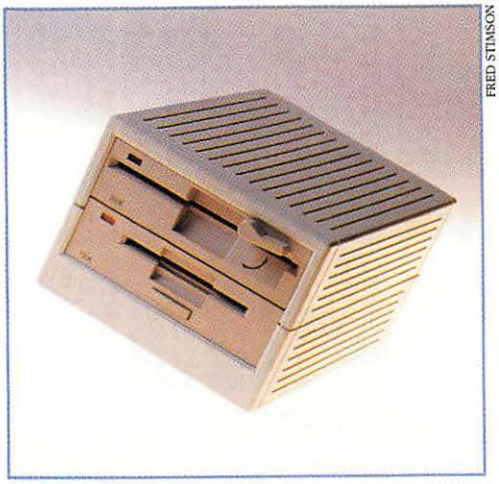
Even with file-conversion software, you may have to do some additional work to prepare a file for use. For example, when you translate a *WordStar* document to *MacWrite,* the software embeds ruler lines throughout the file. Similar ruler and tab clean-up problems occur when you convert *MultiMate* documents to *MacWrite.*

Clear, well-written documentation that accompanies both the DaynaFile and *MacLink Plus* should answer any questions you might have.

### Apple Drive

After I'd put the DaynaFile through its paces, the Apple drive looked one-dimensional by comparison. For starters, the drive needs a controller card that's installed in the expansion slot. And only one format is available: 5¼-inch 360K. To make matters worse, you can't even use it without an SE or a Mac II.

To install the floppy disk controller card you'll need to take your Mac to an Apple dealer. Once the card is installed, using the drive is fairly simple. A cable (provided) connects the drive from the controller card in the expansion slot to the disk drive. The drive's slim gray case blends well with the SE, but you'll soon find yourself looking beyond cosmetics.



FRED STIMSON

*One possible DaynaFile configuration would include two drives—a 5¼-inch 360K drive and a 3½-inch 720K drive.*

FRED STIMSON

*In comparison, the Apple drive is available in only one format—a single 5¼-inch 360K drive.*

Since the device does not support the Finder, no desktop icon is provided. You'll have to load *Apple File Exchange,* Apple's file-transfer utility, before you can look at the files. Although the Apple drive is a hair quicker than DaynaFile in reading and displaying a list of files on the disk, the extra step can be annoying.

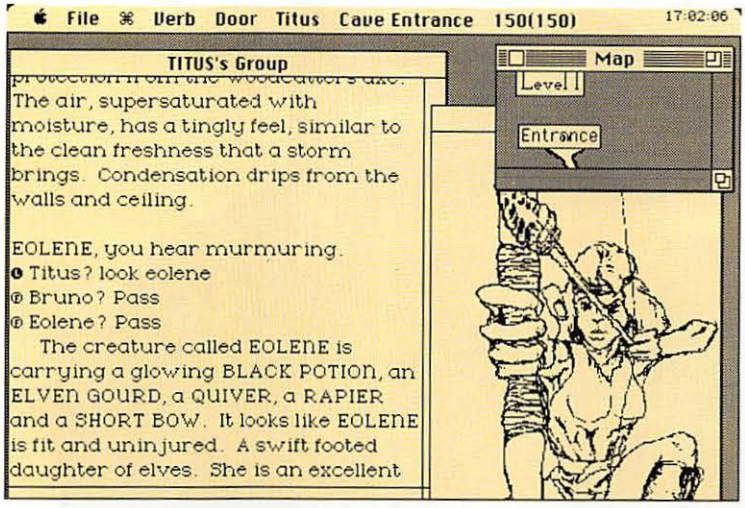
Unfortunately, the current version of *Apple File Exchange* supports only text, binary, and DCA files. (Now that Apple has introduced a translation architecture, other formats will probably be available soon.) Another limitation is the rather thin documentation, which doesn't offer much advice on troubleshooting.

Before you choose one of these drives, carefully consider your needs. If the only MS-DOS files you deal with are on 5¼-inch 360K disks and you're a dyed-in-the-wool Apple fan—you may want to give the

Apple drive a look. It's cheaper than the DaynaFile, but it's less versatile, since it supports only one PC format. That format is also quickly becoming obsolete: IBM has switched to the 3½-inch 720K format with its PS/2 product line. The high-density 1.2MB disk is standard on ATs and clones, and virtually all laptops support only the smaller 3¼-inch 720K disk. A more significant problem is the required controller card's commandeering of an expansion slot.

Although the DaynaFile is more expensive, its ease of use, SCSI port connectivity, and ability to handle any MS-DOS disk format make it the wise choice for PC translation.–*Ken Smith*

See *Where to Buy* for product details.




***Views to a Dungeon***
*An automatic map, graphics, and interactive text reveal details about your surroundings and comrades-in-arms.*

# The Dungeon with a Difference

***Quarterstaff** 1.0*

***Fantasy role-playing text adventure.***
***Pros:*** *Interface lets you concentrate on solving game puzzles, rather than on the quirks of the interface.* ***Cons:*** *Review copy contained fatal bug that prevented completion of game.* ***List price:*** *version 1.2 $49.95.* ***Requires:*** *1MB.* ***Copy protection:*** *None.*

Well, well, well. A fine mess indeed. It was bad enough when the Wild Wizard stole the Blue Stone, forcing you to chase him up and down three levels of torturous dungeon. You needed the Blue Stone to get beyond the Throne Entrance, which had been sealed by "majic." But now that you've gained entrance to the Throne Room, your troubles have just begun. The living Granite Statue with its Mace of Destruction was child's play compared to this demon with the Dancing Sword. Duck!

In *Quarterstaff,* by Simulated Environment Systems, you must direct a group of three adventurers in a mission to penetrate the devastated underground colony of the Tree Druids, discover what has befallen the colony, and risk your lives to set things right again. You'll also want to grab all the booty you can possibly carry. Who says altruism need go unrewarded?

As you explore, you'll find that the colony isn't exactly uninhabited. You needn't kill every thing or person you encounter, however. Alliances are possible. Some strangers can be quite helpful, although a little bribery is usually in order. Some may even join your group.

Your actions are not limited to fighting, exploring, and accumulating treasure. There are real puzzles to solve, and hard battles must be fought to gain the barest of clues. You must explore everything to find the objects you'll need on the way. In addition, your warriors must eat and rest. Suicide is always an option.

You control the characters in typical text-adventure fashion–stringing together verbs and nouns, hoping to achieve the desired result. Objects that may be acted upon are capitalized in room descriptions and also appear as menu items under the room's name in the menu bar. In *Quarterstaff,* objects have bulk and weight, and there is a limit to how much of each your individual characters can carry. An automatic mapping feature contributes enormously to the enjoyment of the game.

### Many Ways to Skin a Dragon...

*Quarterstaff* offers a refreshing degree of flexibility in the types of activity it will accept. You can divide your group to explore different rooms in the Tree Druid colony and in the massive edifice you'll discover beneath it. In combat, you can engage in missile fire across room boundaries–Eolene can stand out of harm's way and fire arrows at a monster in the next room while Bruno and Titus charge in and attack face-to-face. The ability to direct individual or group efforts gives you a certain amount of tactical creativity. Also, there are no true death traps. You can usually find a way out of everything, or bring the other characters to the rescue.

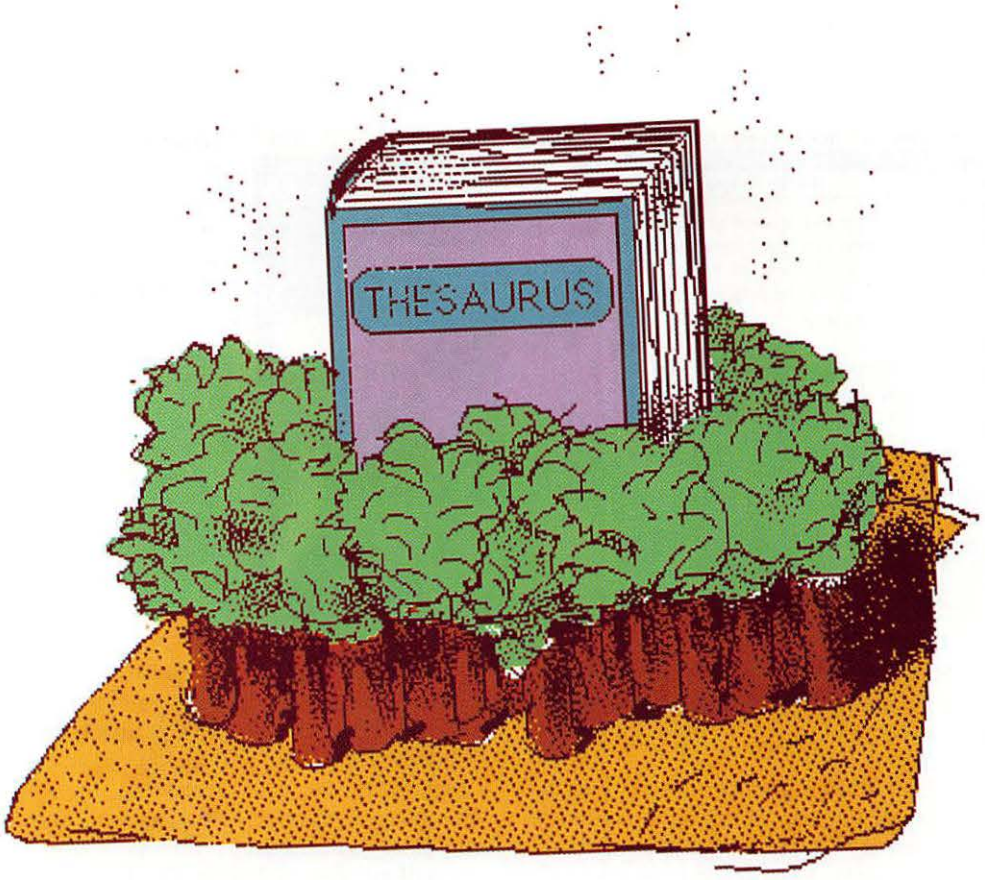
Unlike traditional adventure games, *Quarterstaff* will not grant your characters additional hit points each time they advance a level, since they don't advance levels. They *will* gain proficiency in the activities they practice. Spend a lot of time clubbing monsters, and you'll get better with blunt objects, but your skill with a sword will not change.

### Quarterstaff at Half-Mast

I encountered problems with the review version. The parser wouldn't accept some of the verbs listed in the Verbs menu. As the game progressed, I discovered that arrows that had previously worked fine with the Short Bow would inexplicably become "too bulky" to fit into it later. This and similar incongruities diminished the overall feel of realism that sets this game apart. Much more disturbing was a fatal flaw. A particular puzzle, once worked through, should give you access to a key that you need to complete the game. However, even after arming myself with a cheat sheet and duplicating the actions required to solve this puzzle, I did not succeed.

*Quarterstaff* is a new approach to an old computer-game genre. It really shines in its power to create an intriguing and baffling alternate world for the player to explore. The game's flexible approach to directing group or individual action allows many creative ways to solve the mystery. Sound, graphics, and automatic mapping contribute to your enjoyment. As *Macworld* goes to press, I have received version 1.2 of *Quarterstaff,* which may have corrected the fatal flaw noted above. But because of that flaw, I cannot in good conscience recommend version 1.0.
–*Otto Waldorf*

See *Where to Buy* for product details.




# Looking for the Right Word

***Word Finder** 1.0*

***Thesaurus desk accessory.*** ***Pros:*** *Works with most applications; automatically replaces the original word in your document; optional small thesaurus for those with limited disk space.* ***Cons:*** *Thesaurus not name-brand; synonyms do not match the number or tense of the word they replace; large thesaurus plus DA requires 350K of disk space.* ***List price:*** *$59.95.* ***Requires:*** *512K.* ***Copy protection:*** *None.*

Despite spelling checkers galore and several grammar checkers, Macintosh users had little to choose from in electronic thesauri until Microlytic's *Word Finder* came along. *Word Finder,* a desk accessory that comes with two thesaurus files, requires about 29K (for the DA alone) and works with most Macintosh applications. To avoid constantly having to tell *Word Finder* where to find its data files, you need to copy one of the two thesaurus files to the System Folder, an application folder, or to the desktop (not in any folder). The 322K thesaurus file contains approximately 220,000 synonyms; the smaller, less complete one takes up 162K disk space and contains only 120,000 synonyms.

### In Search of the Perfect Word

Looking up a word in *Word Finder* involves simply selecting the word in your document and choosing *Word Finder* from the Apple menu (from then on *Word Finder* appears on the menu bar as WF). You can also open the menu with ⌘-L, or substitute a ⌘-key equivalent if ⌘-L conflicts with a shortcut in your word processor. Another nice touch is that *Word Finder*'s window, which fills half the standard Macintosh screen, can be set to open either above or below the selected word, so you can continue to view your word in context. *Word Finder* displays synonyms organized first by part of speech, then by meaning (each new meaning is indicated by an infinity symbol [∞] in the left margin). For long entries you can scroll through the synonym list with the mouse (but not the arrow keys). If *Word Finder* does not recognize your word, the program suggests 24 words close in spelling to your original. (You can also use this feature as a low-power spelling checker.)

A row of control buttons at the bottom of the window lets you take various actions (see "A Better Word"). If you choose one of the synonyms listed, the Replace button will substitute the new word for the old one in your document. If you don't find just the right word, you can click on a synonym to display *its* thesaurus entry. If you have looked up a number of different words in your quest for the right one, but can no longer remember which you liked best, the Last Word button enables you to return to the previous ten thesaurus entries. You can also search for any word that comes to mind by typing it directly into the Find text entry box.

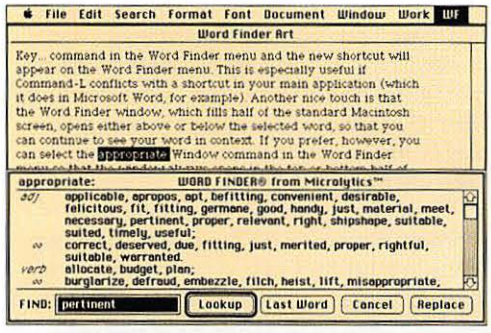
### Not Roget's

Although *Word Finder* recognizes verb tenses and plural nouns, it doesn't make the corresponding change to a word it substitutes in the text. (Synonyms of words that were originally capitalized or entirely uppercase, however, are entered in your document in matching format.)

A more serious problem is that since *Word Finder*'s thesaurus was created specifically for the program, its entries often lack the polish, the variety, and the depth of entries in established classics like *Roget's Thesaurus.* And not infrequently, *Word Finder* won't recognize your selected word. For example, a number of words in this review (including *menu, half, shortcut, plural, scroll,* and *synonym*) were unknown to *Word Finder,* but easily located in *Roget's.*

While its use of a non-name-brand thesaurus is a serious shortcoming, *Word Finder* is nonetheless useful–and more convenient than a printed thesaurus. Since it may be a while before a better alternative comes along, I recommend it to people who want an electronic companion to a spelling checker. Just don't throw out your copy of *Roget's* quite yet.–*Robert C. Eckhardt*

See *Where to Buy* for product details.




***A Better Word***

*Click on the desired synonym in the* Word Finder *window, and then click on the Replace button to change the original word in your document to the new one.*

# Color Cutting

***ColorCutter** 1.0*

***Color separation service.*** ***Pros:*** *Easy to use; reduces printing costs.* ***Cons:*** *Separates only* Adobe Illustrator *files.* ***List price:*** *Four-color separations, $72 minimum;* ColorHelper *free from online services.* ***Requires:*** *1MB.* ***Copy protection:*** *None, but software works only with People's Publishing service.*

Creating color separations mechanically is a laborious task. You must cut each color area separately, using a special masking material called *Rubylith.* By finding a way around this part of the color-separation process, you can realize substantial savings, and if you can skip the prepress camera work as well, you can reduce printing costs by one-third or more and gain greater control over the final results–providing you have a clear understanding of the four-color process. Now ColorCutter, a service from People's Publishing in Atlanta, provides this option. ColorCutter allows you to experiment with full-color graphics by creating camera-ready color separations of *Adobe Illustrator* drawings.

ColorCutter is a service in two parts. First you use *ColorHelper* software to create color separations by specifying a Pantone Matching System (PMS) color for each object in an *Illustrator* drawing.

Once you create the color separations for the drawing, you can place it in any page-layout program that accepts PostScript files. Finally you send the files to People's Publishing, which produces negatives from a Linotronic 300.

### Creating Color

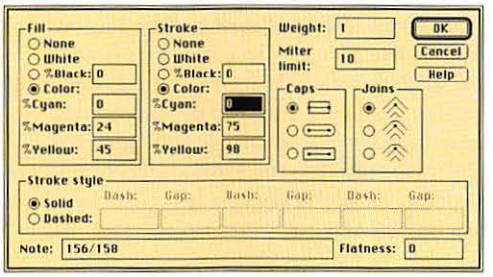
*ColorHelper* allows you to choose between the two basic methods of color separation–the color wheel and PMS numbers (for more information on color separations see "Beyond Black and White," *Macworld,* November 1987). With the color wheel method, you separate each object manually by specifying the desired screen tints in the Paint dialog boxes. Your other option is to let *ColorHelper* figure the correct percentages of each color for you, by simply indicating the PMS color you want in the Note box (see "Separation Magic").

*ColorHelper* is simple to use: open the application, choose the files you want separated, and the program does the rest. It reads PostScript and EPS files. EPS files are converted to PostScript files and show up in *PageMaker* as a gray box.

Although the system is impressive, there is a catch–to print separations you must send the files to People's Publishing. If you send the files elsewhere, the results you get may not match the PMS value you chose. It isn't exactly copy protection, but what else can you call it?

How quickly you get your negatives back depends on the size of the files, how you send them, and whether you want color proofs. I sent two simple *PageMaker* pages to People's Publishing by overnight mail and requested Chromalin proofs. It took less than five working days from the time I shipped them to get the finals.

Regardless of how quickly People's Publishing responds, however, users who produce four-color work like to keep their jobs within screaming distance. People in California will think twice before sending jobs across the country for printing.




***Separation Magic***

*With* ColorHelper, *the user enters the correct PMS colors for the fill and stroke.* ColorHelper *separates the colors and lists the percentages in the Fill and Stroke boxes. The file is now ready to send.*

### Professionals Only

Even though it is easy to use, ColorCutter is not for amateurs. Its only documentation is a pamphlet that describes the service. It is informative, but it's hardly adequate instruction for someone plunging into the complex world of four-color printing for the first time.

If you are producing four-color work, you will need register marks on each page or separation. Unfortunately, *ColorHelper* provides no system for adding register marks automatically–a big drawback to an otherwise fine system.

In spite of its drawbacks, the ColorCutter service is the most versatile and useful system I have seen for creating color separations on the Macintosh. The professional who regularly produces four-color publications can save thousands of dollars without sacrificing quality. For the average desktop publisher, however, four-color printing remains more a dream than a real alternative.–*Jim Morton*

See *Where to Buy* for product details.

# Brain Gain for AI

***MacBrain** 1.1*

***"Neural network" connection-based programming system.*** ***Pros:*** *Easy-to-learn, graphics-oriented modeling system; ideal platform for parallel computing applications.* ***Cons:*** *Large models run slowly on Mac Plus and SE.* ***Requires:*** *1MB.* ***List price:*** *$300.* ***Copy protection:*** *None.*

*MacBrain* is the first artificial intelligence (AI) program that allows you to design system models visually, by setting out a pattern of decision-making units and then defining the connections between them. Although it was developed in the course of author Matt Jensen's graduate work in neural network analysis, it's really a general-purpose tool kit with many uses. *MacBrain* can solve difference equations, model analog electrical circuits, attack classic computer science issues like the traveling salesman problem (planning the shortest round-trip route through a set of cities), and play simple games. Ultimately, *MacBrain*-developed programs will run at very high speed, because of their built-in parallelism (each unit in a *MacBrain* model acts as a separate computer) on multiprocessor boards being designed for the Mac II.

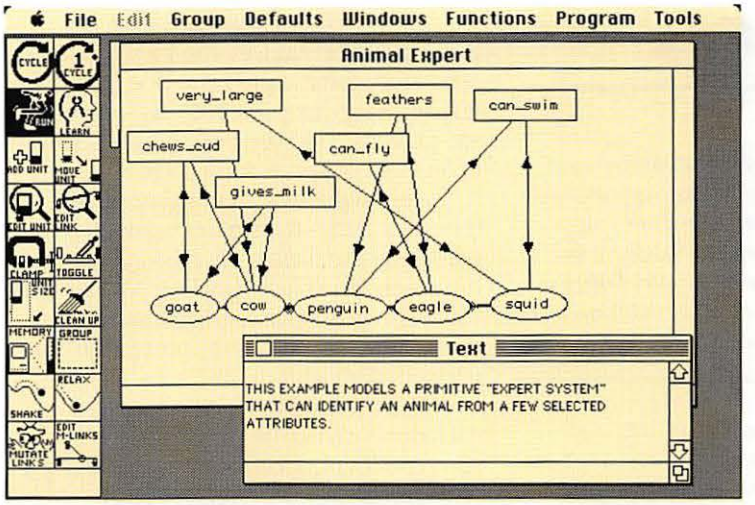
### Thinking with MacBrain

At the core of *MacBrain* as a programming language is the idea of a unit (or network node) that starts out in a user-defined activation state. That unit can then receive input from other units, according to a user-defined connection diagram. Each node performs an internal computation to change its activation state, and then emits output to other units according to the connection diagram. The time continuum, for purposes of computation, is broken up into discrete cycles. After many cycles, the units

may: settle into some stable pattern of activation states; oscillate among a group of stable states; or fluctuate, apparently at random. All these state-patterns represent the behavior of underlying equations–but *MacBrain* lets the programmer go directly from defining a model in terms of connections to observing a model simulation without having to formulate the problem mathematically.

The simplest example (see "Tick Tock") of processing units and their connections is given by the program's beginning tutorial example (*MacBrain* features a standard manual and a nicely done interactive *HyperCard* tutorial). In this example the units in Clock can take only two states, on or off, and they can only pass the on activation state back and forth. Thus each time Cycle is called from the palette, the on state toggles between the units.

This basic example immediately suggests obvious ways to make things complicated: add more units to a model, make the units more complex, and increase the number of connections. You could make rings of units, so that the activation passes along the ring in a circle. You could make the units more complex than simple on/off nodes. Finally, you could wire up these complex nodes in a tree diagram or another multiply-connected diagram. Instead of the cumbersome reprogramming needed to make changes in other network systems, *MacBrain* lets you tinker with models simply by invoking Add Unit, Remove Unit, and Edit Link.




***Talk to the Animals***
*This micro-expert-system works two ways: it will give you the characteristics of an animal from the name, or will pick out an animal from the description. This type of network is easy to expand in* MacBrain.

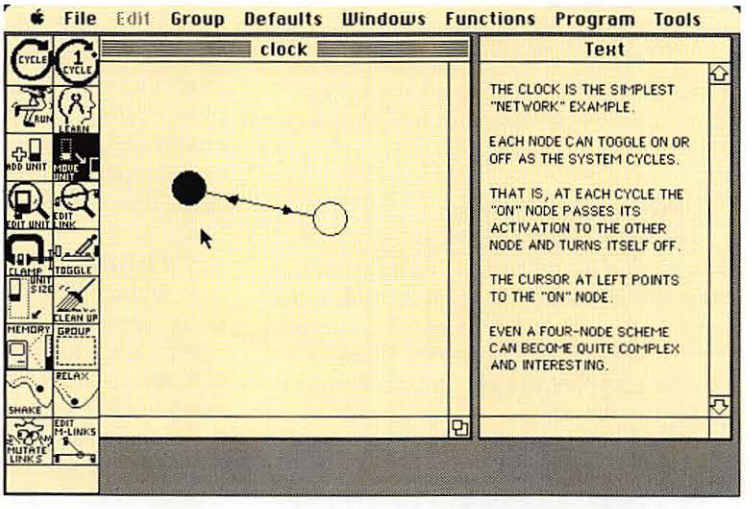
Toy expert systems written in Logo and LISP are relatively easy to understand, but *MacBrain* users can even develop decision systems just by drawing arrows (see "Talk to the Animals"). To construct an expert system that can identify an object by its attributes, you simply define one set of units as attributes (very large, feathers, can swim) and another set as objects (cow, penguin, eagle), then make links between the appropriate attribute and object units. Even this kindergarten example has two impressive virtues: first, it's clear how to expand it to include more animals or more subtlety; and second, the program code generated by this example will automatically be suited to the high-speed parallel processors of the very near future. Even on a standard Mac SE, a streamlined 80-object system performed identifications as fast as attributes could be input.

### It's Wet and It's Wild

These examples, which involve no "learning" by the network, just begin to hint at *MacBrain*'s scope. *Wetware* gurus (researchers interested in modeling real neural activity) have constructed very simple software models of memory that learn, forget, and even dream. *MacBrain* includes a nearly complete array of tools for building these and fancier neural models. There's a choice of unit-activation functions to define a unit's response to inputs–an all-or-nothing toggle, simple addition of inputs, addition with threshold, and function-weighted addition are all possible. There's also a choice of learning functions, which tell the network how to change its own parameters to make correct outputs appear for given sets of inputs. An assortment of graphing functions for recording unit activity histories is provided, and text windows can be linked to models for documentation or programmer's notes.

Besides constituting a painless introduction to practical AI for newcomers, *MacBrain* can be used as a serious network modeling system by professional researchers and is easily the shortest route from idea to working model for anyone interested in testing conceptual AI schemes. It's very much a work in progress, but a visit to the construction site is worthwhile for both spectators and pioneers at the frontiers of computer science.–*Charles Seiter and Beverly Kane*

See *Where to Buy* for product details.




***Tick Tock***
MacBrain *can build this simple clock network in less than a minute. In four or five minutes, the program can build complex networks whose behavior takes days to understand.*

# Just the Stacks, Ma'am

***Public domain and shareware* HyperCard *stacks.***

*This review covers a variety of* HyperCard *stacks available from online sources such as CompuServe and GEnie, and from various user groups. Many stacks are free; shareware prices range from $5 to $10 each. All stackware requires 1MB.*

My name's Nielson. I carry a disk. My assignment: to traverse the mean streets of CompuServe—where one false keystroke can plummet the unwary back to the main menu (or worse)—in search of *HyperCard* stacks. *Finding* stacks was no problem; online services, bulletin boards, and user group disks are full of stackware. The hard part was shuffling through scores of stacks in search of notable offerings. But I found some, as you'll see.

*HyperCard* has already given rise to a microcosm of applications: games, tutorials, utilities, databases, educational exercises...even stackware magazines. The following sampler will give *HyperCard* neophytes a taste of what's available. If you don't have access to an online service like CompuServe or GEnie, try your local user group. For instance, the Berkeley Macintosh User Group (BMUG) distributes most of the stacks mentioned here.

### Informational Stacks

A number of stacks provide tips or utilities to help you examine others' stacks or dissect your own. These informational stacks vary in complexity; some are intended for *HyperCard* beginners, while others are aimed at hardcore stack-hackers. *Hidden Scripts,* from Marc Rochkind, offers a handy piece of advice if you're confronted with a stack that has a hidden menu bar: press ⌘-M to bring up the message box, type **show menubar**, and press Return to make the menu bar appear. With the menus available, you can reset the user level and view the application's scripts. As Rochkind points out, a good way to learn about *HyperCard* programming techniques is to look at other people's implementations of HyperTalk.

*Script Report,* a $10 shareware utility from Eric Alderman, produces a readout of all the scripts in a selected stack. The listing, which shows a button-by-button breakdown of scripts for each card in a stack, can be viewed on the screen or printed out for further study.

Another $10 shareware stack, *Stackware Detective,* by Peter Olson, provides everything you always wanted to know about stacks. Scripts, object types, object headers, field values, and field and button definitions are detailed. *Stackware Detective* even prints a hex dump of all the information in a stack. While this level of detail will be overkill for many *HyperCard* programmers (after all, *HyperCard*'s raison d'être is to make programming accessible to those of us who never owned a pocket protector), old-school programmers will appreciate this debugging aid.

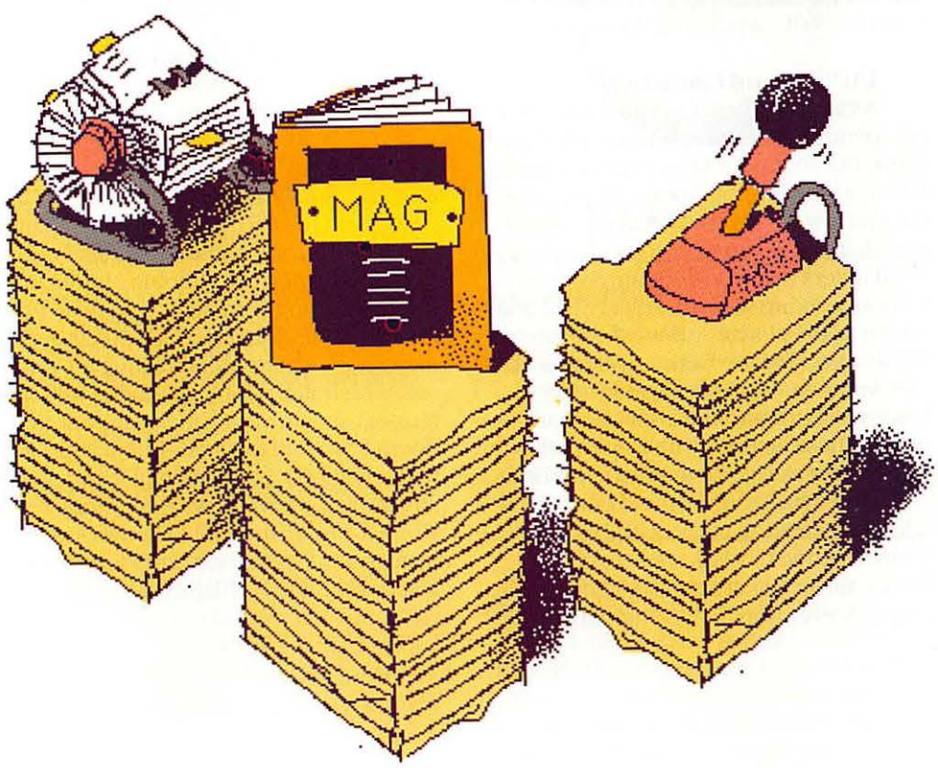
Not all informational stacks refer to other stacks, of course. Stacks offering everything from lists of online bulletin boards to hardware and software tips are appearing. For example, Helen Adams's *MacHelp* stacks give dozens of hints under the following categories: Font/DA Mover, System, Finder, Printing, Hard Disk, and General. You can use these stacks as the foundation for your own tips file, adding cards as you collect Mac-related information.

### Games and Educational Stacks

*HyperCard*'s built-in paint program makes it a natural for creating games. One of the more ambitious efforts is *DragonSword,* an adventure game written by Nat Ingalls, age 12, and illustrated by Andy Ingalls, age unknown. The adventure begins in the Forest of Gloomoola and meanders through castles and caverns populated with the requisite maps, potions, dragons, and damsels. Click on a door to enter a room or passageway, click on an object to learn about it, and so on. I enjoyed the game, even though I did have some trouble empathizing with our hero, who looks like a cross between Conan the Barbarian and the Elephant Man.

Another adventure is *Inigo Gets Out,* by Amanda Goodenough. This charming story, in which a housecat ventures into the outside world, is a showcase for *HyperCard* special effects, sound, and animation. (A hint for *HyperCard* beginners: if you get lost in a *HyperCard* game—or any card, for that matter—press ⌘-Option to reveal the location of hidden buttons.)

Educational applications are also popular. The best one I've come across is Jim Ludtke's *Neurotour,* a trip into the inner workings of the human brain. The tour begins with a picture of the entire brain, then zooms in on progressively smaller components, from neurons, to the parts that make up a neuron, all the way to a close-up of a dendritic spine—with accompanying text for each illustration. *Neurotour* is a work



Dynamac is available in two models, the EL (reviewed here) and the less expensive GP, which has a different display. On

***What's on the CRT Tonight?***
MACazine's *stackware publication,* Mac TV, *uses the familiar interface of a television set. Change the channel to see news, reviews, and*

there are enough stacks out there to rival the skyline of Gary, Indiana; one person can't possibly keep track of them all. If I can get *Macworld* to shell out my fee again ($25 a day plus expenses), maybe I'll uncover some more.–*Erfert Nielson*

Reviews

charts to display a person's roots, starting with that individual and working back in time. Conversely, you can create a chart of descendants that starts with an ancestor and branches forward to the present. These charts can also include other information about each individual.

Another useful feature is the ability to search through historical family information using specific research criteria to pinpoint trends. What's more, *Family Roots* lets you store additional information on each person in separate files of any length, which can be transferred as text files for editing with a word processor.

In addition, the program lets you use the Mac's printer interface to select various fonts, styles, and sizes for printing charts or sheets. A *sheet* printing feature creates single- or multiple-page printouts of all information pertaining to a specific individual or family. Similarly, you can also print alphabetized and numerically ordered lists of names in a tree as well as select the number of generations you want printed. Finally, a *soundex* feature lets you search a family tree for names that sound alike even if spelled differently. Since much available genealogical data comes from U.S. Census Bureau records–which use a soundex standard that eliminates vowels from last names–this feature can help to ferret out misspellings.

A few holes remain in the current version's user interface, requiring more keyboard interaction than do most Mac programs. For example, some dialog boxes lack buttons to click on; cut, paste, and copy functions don't always work. For now, doubting Thomases may order a demo disk (capable of storing 30 records) at a nominal cost and/or the complete 150-page manual; the prices of both are deductible from the total cost if you decide to buy the program (which carries a 60-day money-back guarantee). In addition to technical support by telephone, there's a user group of approximately 1700 members that publishes a bimonthly newsletter. In a series of updates to its Mac incarnation, Quinsept plans to incorporate all the features now found in versions of *Family Roots* running on other computers.

As of now, *Family Roots* is probably the best genealogical program available for the Mac, with cheap updates ($22.50 each for registered owners) forthcoming. –*Robert Cowart*

See *Where to Buy* for product details.

# Away with Words

***Icon-It*** *1.0*

***Pictorial menu creation utility.*** ***Pros:*** *Simple to install and modify; allows users to access macros as well as menu commands.* ***Cons:*** *Scanty documentation; limited graphics capabilities.* ***List price:*** *$79.95.* ***Requires:*** *512KE.* ***Copy protection:*** *None.*

I like icons. Given the choice between typing "delete file" and dragging a picture of a document into a picture of a trash can, I'll always opt for the latter. If you're similarly inclined, you'll enjoy *Icon-It*. Olduvai Software's clever utility lets you replace almost any program's menu commands with a row of icons called an *icon bar*. *Icon-It* records a menu command's function–Save or Print, for example–from within a program and assigns it to an icon. You create the icon with a paint program, draw it with *Icon-It*'s editor, or copy it from templates included with the program.

### Carry-Out Menu

A cute idea, but why would anyone want to add icons to an already icon-infested Mac program? I can think of several reasons, but speed is *Icon-It*'s main selling point. If I use a program infrequently, I sometimes forget where a particular command lives–was it in the Layout menu or the Arrange menu? Fumbling from menu to menu is time-consuming. With *Icon-It,* you can convert hard-to-find menu items to continually visible icons (see "Quick Clicks").

Even if you're intimately familiar with the contents of a program's menus, *Icon-It* can save you time. It's no secret that many menu commands have no ⌘-key equivalents, forcing you to open a menu and select the command. I've worn a groove in my mouse pad from zipping up to *MacWrite*'s File menu to select Save (serves me right for using *MacWrite,* you're undoubtedly thinking, but it suits my needs; heck, I still drive a '63 Dodge Dart, too). *Icon-It* lets you line up a collection of up to 27 frequently used menu commands and assign a pictograph to each. You can then click the commands from a central location–the icon bar–much faster than pulling down menus and choosing commands. And *Icon-It* doesn't stop at commands; you can create macros with a program like *Tempo* or *Excel* and assign each macro an icon.

In addition to increased speed, *Icon-It* offers convenience. People have different working styles; few users operate a program in exactly the same way. The ability to pull together a set of often-used commands or macros lets you customize a program to fit the way you use it.

### I Think Icon

I would be straying dangerously close to hyperbole if I said that installing an icon bar is simplicity itself–but it's not hard. You drag the *Icon-It* application into a System Folder to install it as a desk accessory. Select *Icon-It* from within an application to open the Icon Bar Editor, a dialog box in which you set attributes such as the size and number of icons you want and the screen position of the icon bar. Then paste in or draw your icons and assign them functions by selecting the appropriate

able as the game begins. As you solve each puzzle, you're allowed access to more puzzles, you're shown additional text of the story, and you're rewarded with a fragment of a map. In the second phase of the game, you must secure and correctly align all of the map pieces. The completed map itself contains not only the puzzles of the third phase but some of the clues necessary to solve them.

### The First 60 Puzzles

A few of the first 60 puzzles require agility with the mouse, but the rest are jumbles (of graphics, words, or letters), decoders, mazes, word puzzles, word searches, and memory tests. There is a unique card game whose rules you must determine before you can play. The button-text puzzles are the most difficult. Each button clicked either presents or mixes text in a way peculiar to it. Someone I know wrote a program in *Microsoft BASIC* to solve the most difficult button-text puzzle. The program takes 24 hours to run on a Mac II, but it reveals four solutions.

Although some of the puzzles permit you to park your pieces temporarily outside the puzzle's frame, the map requires that all of the pieces remain inside the frame. As a result, when you move a piece it invariably disrupts another area, increasing the difficulty of completing the map. You can find ways to break the rules if you're resourceful, and it helps considerably to play with friends, but the manufacturer sells a hint book for the desperate among us.

For assembling the map you gain screen access to the entire text of the game, which you have the option of printing on an ImageWriter (but not on a LaserWriter.)

### The Final 14

Because of the epic proportions of the first 60 puzzles and the difficulty in assembling the map, it comes as a surprise that a considerable amount of the game remains to be played, with entirely new puzzles and different tasks. More than one player will lose heart at this juncture. Each of the new puzzles lies on sections of the map that refer to the initial 60 puzzles. Clues reside in those map sections and in the highlighted sections of the correlated text. Although daunting, it is possible to complete the game, given sufficient motivation, ingenuity, and time. Patience and orderly thinking should get you through most of the challenges.

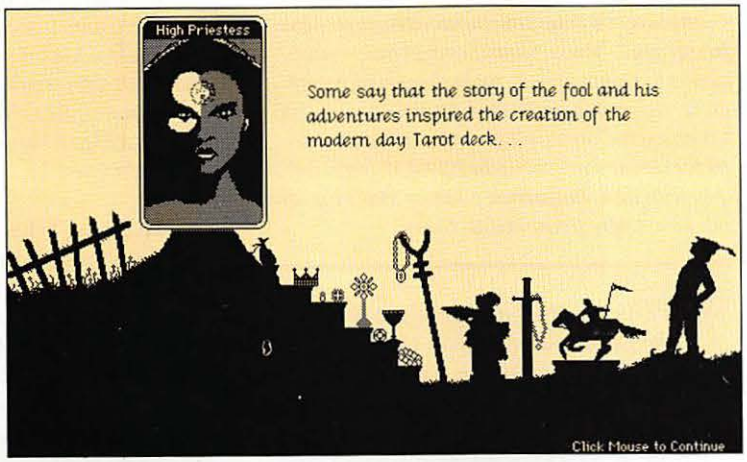
It's more difficult to complete version 1.0 of the game, because a deadly bug causes the loss of your position in as many as 54 completed games, if you save your game while in High Priestess. Although you can't die in puzzle games, you may wish you had if this happens to you. Miles offers a free exchange of the Game disk to the debugged version 1.1 and also free exchange of the Prologue disk to 1.1, for those who want to run the game (without color) on a Mac II.

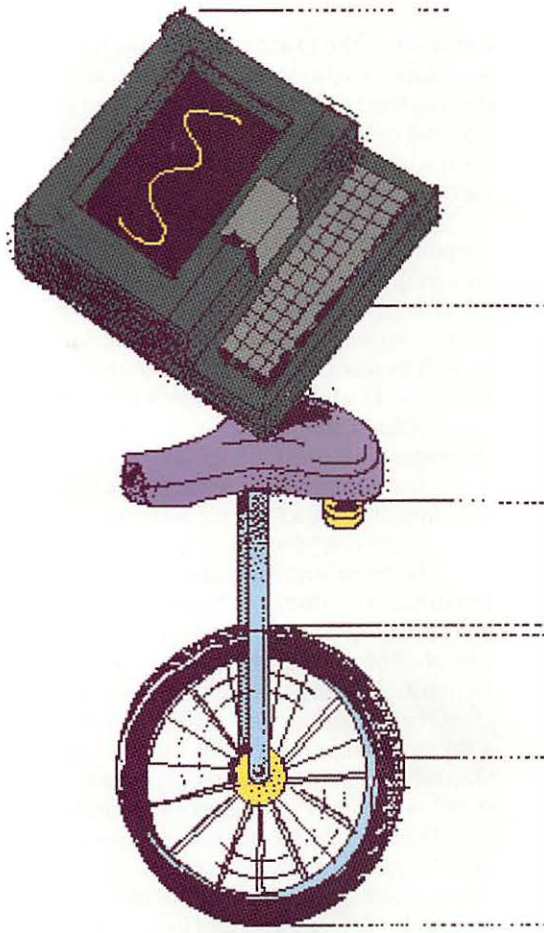
The publisher offers excellent support in addition to these free upgrades. The hint book that is available provides the answers, but it does not always teach you how to solve the problems; you can also telephone for help.

*The Fool's Errand* provides a diverse array of puzzles within a unique and attractive presentation. It offers surprises and challenges for the serious gamester and some excellent special effects.
*–Linda Joan Kaplan*

See *Where to Buy* for product details.

***The Finale***
The Fool's Errand *has a sustained theme inspired by the deck of Tarot cards.*



# Mac to Go

### *Dynamac EL*

***Portable Macintosh.*** ***Pros:*** *Fully Macintosh compatible; easily transportable; bright, easy-to-read display; internal hard drive and modem available; switchable power supply.* ***Cons:*** *High price; lacks a usable battery pack.* ***List price:*** *$4995; $8433 with internal hard drive and modem; see* Where to Buy *for price breakdown.*

Remember when a 40-pound television set used to be called "portable" just because it had a handle? Although Macintosh users haven't had it quite so bad, the Mac has never really traveled well. Fortunately, Dynamac Corporation has come up with two elegant solutions.

### A Macintosh in New Clothing

Dynamac is available in two models, the EL (reviewed here) and the less expensive GP, which has a different display. On

the surface, the Dynamac bears as little resemblance to the Macintosh as the Mac II does to the SE. It folds into a compact package that easily fits under an airplane seat, even when stored in its optional padded carrying case.

Setting up the Dynamac couldn't be simpler. Most of the rear panel switches and connectors will be familiar to Macintosh users, including SCSI and disk-drive ports, two serial ports, and an audio jack, as well as reset and interrupt buttons. Dynamac EL also has a socket for an external keyboard, and a video port capable of driving a Big Picture CRT from E-Machines and some composite video monitors. For traveling abroad, a selector lets you switch over to 220-volt/50-cycle operation.

The most striking thing about the Dynamac is its display screen, which pops up (revealing the keyboard) when release tabs at either side of the case are pressed. Dynamac EL's electroluminescent screen glows bright amber and displays 640 by 400 pixels, 46 percent more than a standard Macintosh. The image is sharp, bright, and very easy to read, even over extended periods. The only drawback is that at some angles the antiglare coating reflects overhead lights, making the display difficult to see; a variable-tilt feature would be useful. A brightness control would also be a welcome addition for work in dimly lit areas.

### The Inside Story

At the heart of the Dynamac is a Mac Plus, repackaged by Dynamac, which guarantees 100 percent Macintosh compatibility. I wasn't able to find any applications or desk accessories that wouldn't work as expected. Those with resizable windows were also able to take advantage of Dynamac's larger display area. Like the Mac Plus, Dynamac comes with 1 megabyte of RAM (expandable up to 4MB) and an internal 800K floppy disk drive. A reasonably quiet fan and a surge suppressor round out the list of standard features.

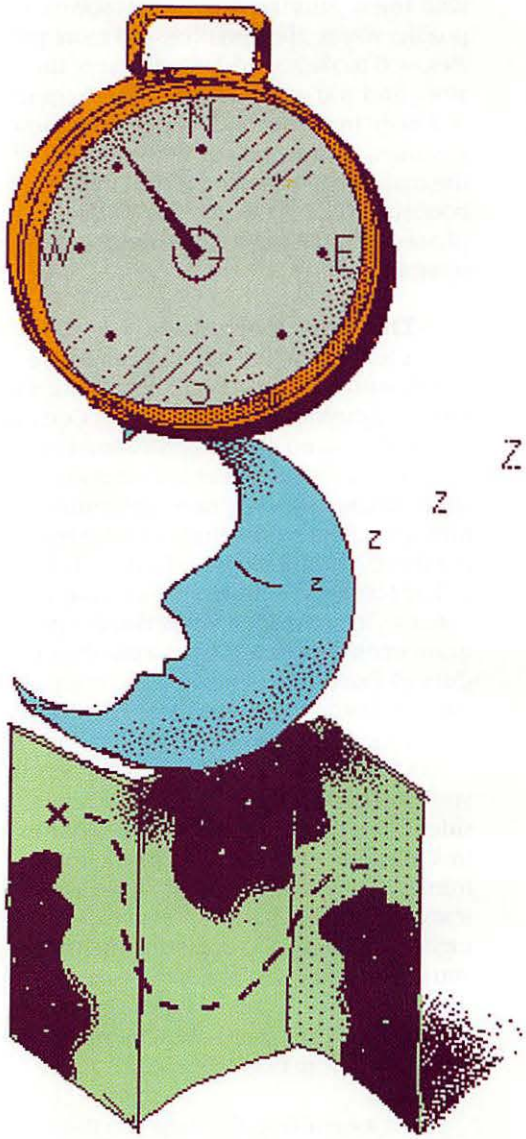
A built-in 300/1200-baud modem is optional; like the power supply, it's switchable between the U.S. Bell 212 and CCITT international standards. You can also choose to add an internal 20- or 40MB hard disk–the 40MB drive in my unit, although not blindingly fast, performed flawlessly. The manual covers setup procedures only briefly, and devotes most of its 100 pages to describing the Macintosh interface. Even so, first-time Mac users should have no problems getting up and running.

### Taking It with You

Is Dynamac the much-sought-after portable Macintosh we've all been waiting for? Not really, especially if you're after a machine that you can carry with you on the plane and use while you're in the air. Dynamac doesn't yet offer a battery pack, because the display consumes too much power to allow extended use. Then, too, at 18 pounds, the *Dynamac* is heavier than some of the lightweights available in the MS-DOS world. Finally, the mouse just doesn't function as well on a human lap as it does on a desk, so any future flat Mac will need a trackball or some other pointing device.

All that aside, Dynamac does offer a unique combination of features that just aren't available from Apple, like the switchable power supply and the modem. The Dynamac is also more compact than the Macintosh, and its rugged construction should allow it to hold up better in the long run. But $4995 is a lot for the EL without hard drive or modem, so I'd stick with a Plus or SE unless your travels require the full capabilities of a complete Mac-based system. Under those circumstances, the Dynamac is an excellent choice.–*Franklin Tessler, M.D.*

See *Where to Buy* for product details.




# Autopilot for CompuServe

***The CIS Navigator** 1.2*

***CompuServe telecommunications access program.*** ***Pros:*** *Simplifies and automates access to CompuServe; makes usage more efficient; can run unattended.* ***Cons:*** *For use with CompuServe only; still has a few bugs.* ***List price:*** *Shareware; version 1.27 $35 registration, $40 with disk.* ***Requires:*** *512K or Mac Plus and modem.* ***Copy protection:*** *None.*

CompuServe contains a wealth of information–if you can find it. *The CIS Navigator* is a unique shareware product that helps CompuServe users find the information they want while saving time and money. It can automatically check forums, read and record messages, send and receive electronic mail, and download software and other material from data libraries. It can work by itself in the wee hours of the morning when files can be downloaded from CompuServe two or three times faster than in the busier evening hours. And it's faster than you are. Though it can work at 300 or 1200 baud, *Navigator* really shines at 2400 baud because–unlike a human–it can read and react at that speed.

### Miles of Tiles

Using an intuitive, Mac-like interface, *Navigator* guides you through writing the routines that will get exactly what you want from CompuServe. Open the program and you see a column of rectangular "tiles." One lets you specify session parameters,

including data rate, phone number, user ID, and password. The other tiles are gateways to groups of CompuServe forums. Double-click on one of these tiles, and it opens to display other tiles. Some of the tiles identify subgroups of forums, others show individual forums. The selections range from the familiar Macintosh Users Forum to the Astronomy Forum to others you may not have known existed.

Double-click on a forum tile and you get a dialog box that lets you specify actions when you visit that forum, such as sending and checking messages in certain subject categories. A Data Library button in the dialog box opens a second box, in which you can collect file descriptions and specify what files in the data libraries to download.

Once you've specified what you want the program to check, you can pick Run from the Session menu and watch *Navigator* go. After running a session, you'll want to review it. If you've retrieved message subjects or titles, you just click on their names and *Navigator* will go back and read them at a later time. Likewise, you can read file descriptions and tell *Navigator* which files to download later. In practice, the best way to use *Navigator* is to make two passes: first scan CompuServe quickly, then review that scan to decide what to read and download when you run the program a second time.

### Electronic Navigation

*Navigator* knows CompuServe's complex structure better than all but the most dedicated hackers. And even if you already know CompuServe inside and out, *Navigator* tracks down information faster than you can, and it works automatically. General-purpose telecommunications programs like *Smartcom II, Microphone,* and *Red Ryder* also let you write routines that automatically access CompuServe, or any other telecommunications service or bulletin board. However, you have to know the service's structure, and even then you face an exercise in macro programming that's more trouble than it's worth for all but the simplest tasks. In contrast, *Navigator*'s tile- and session-review interfaces are so smooth that you don't even realize you have programmed a complex automated routine.

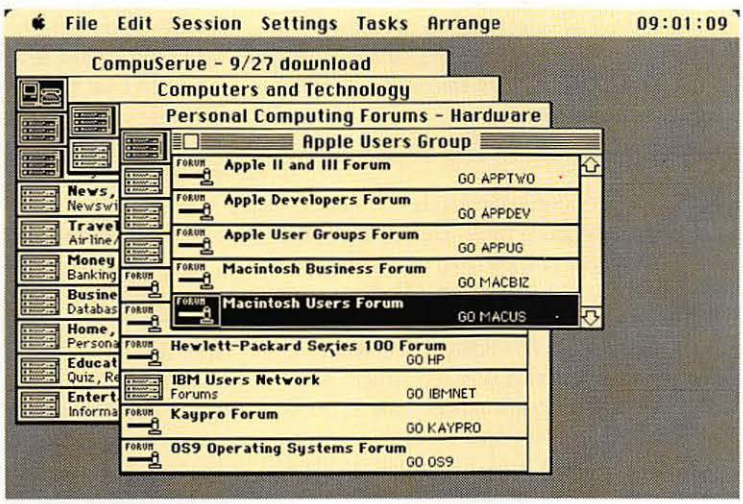
Like some other shareware, *Navigator* is still evolving. Its author, Michael C. O'Connor, keeps adding new touches while trying to overcome a few pesky bugs. If you set CompuServe to check your mail automatically for any messages that are waiting, but there are none, version 1.02 will discard outgoing messages without sending them. *Navigator* also froze while reading messages when an extension phone was picked up; it recovered successfully when the same thing happened during a download using the Xmodem error-correction protocol.

Once the bugs are fixed, however, the main problem with *Navigator* is likely to be that it makes it too easy to use CompuServe–and run up hefty bills.–*Jeff Hecht*

See *Where to Buy* for product details.

***Navigating with Tiles***

Navigator *lays out forums as a series of tiles; opening one of the forums gives access to a dialog box that lets you specify what messages and data-library files to read, check, or download.*




# Out of the Past

***Family Roots*** *1.2*

***Genealogy program.*** ***Pros:*** *Allows editing of names and other data without upsetting genealogical links; external text files can be linked to individual records.* ***Cons:*** *Not all features, including Mac user interface, fully implemented.* ***List price:*** *$72.50.* ***Requires:*** *512K.* ***Copy protection:*** *None.*

*Family Roots,* a comprehensive genealogical research tool from Quinsept, has a plethora of features for tracing family ancestry. With an installed base of approximately 10,000 users on a variety of personal computers, the program has been in use since 1981. The only genealogical program that's more popular is *Personal Ancestral File (PAF)* from the Church of the Latter-Day Saints. That program has been ported over to the Mac, but it does not work with the mouse and is generally cumbersome because it doesn't implement standard Mac features. *Family Roots* takes better–though not complete–advantage of the user interface and provides an easy introduction for beginners as well as a powerful tool for serious genealogists.

In essence, a genealogical program is a database management system configured for storing, retrieving, and printing data about families and their relationships. Predictably, the first step in this process is to enter data–via a dialog box–into a database record. Date and place of birth and death; addresses of living members; names of parents, children, and spouses; and up to nine additional user-defined fields may be entered for each person. At any time you can change information without upsetting the relationship among records in the database. Other genealogy programs are less accepting of alterations, particularly to members' last names, which are often used as the link between records.

Another strong feature of *Family Roots* is its ability to accept new data fields at any time without loss of existing information. For example, you may want to add a slot in each family member's record to indicate other attributes.

### Branching Out

Once you have stored enough data, you can create three types of *pedigree*

charts to display a person's roots, starting with that individual and working back in time. Conversely, you can create a chart of descendants that starts with an ancestor and branches forward to the present. These charts can also include other information about each individual.

Another useful feature is the ability to search through historical family information using specific research criteria to pinpoint trends. What's more, *Family Roots* lets you store additional information on each person in separate files of any length, which can be transferred as text files for editing with a word processor.

In addition, the program lets you use the Mac's printer interface to select various fonts, styles, and sizes for printing charts or sheets. A *sheet* printing feature creates single- or multiple-page printouts of all information pertaining to a specific individual or family. Similarly, you can also print alphabetized and numerically ordered lists of names in a tree as well as select the number of generations you want printed. Finally, a *soundex* feature lets you search a family tree for names that sound alike even if spelled differently. Since much available genealogical data comes from U.S. Census Bureau records–which use a soundex standard that eliminates vowels from last names–this feature can help to ferret out misspellings.

A few holes remain in the current version's user interface, requiring more keyboard interaction than do most Mac programs. For example, some dialog boxes lack buttons to click on; cut, paste, and copy functions don't always work. For now, doubting Thomases may order a demo disk (capable of storing 30 records) at a nominal cost and/or the complete 150-page manual; the prices of both are deductible from the total cost if you decide to buy the program (which carries a 60-day money-back guarantee). In addition to technical support by telephone, there's a user group of approximately 1700 members that publishes a bimonthly newsletter. In a series of updates to its Mac incarnation, Quinsept plans to incorporate all the features now found in versions of *Family Roots* running on other computers.

As of now, *Family Roots* is probably the best genealogical program available for the Mac, with cheap updates ($22.50 each for registered owners) forthcoming.
*–Robert Cowart*

See *Where to Buy* for product details.

# Away with Words

***Icon-It*** *1.0*

***Pictorial menu creation utility.*** ***Pros:*** *Simple to install and modify; allows users to access macros as well as menu commands.* ***Cons:*** *Scanty documentation; limited graphics capabilities.* ***List price:*** *$79.95.* ***Requires:*** *512KE.* ***Copy protection:*** *None.*

I like icons. Given the choice between typing "delete file" and dragging a picture of a document into a picture of a trash can, I'll always opt for the latter. If you're similarly inclined, you'll enjoy *Icon-It*. Olduvai Software's clever utility lets you replace almost any program's menu commands with a row of icons called an *icon bar*. *Icon-It* records a menu command's function–Save or Print, for example–from within a program and assigns it to an icon. You create the icon with a paint program, draw it with *Icon-It*'s editor, or copy it from templates included with the program.

### Carry-Out Menu

A cute idea, but why would anyone want to add icons to an already icon-infested Mac program? I can think of several reasons, but speed is *Icon-It*'s main selling point. If I use a program infrequently, I sometimes forget where a particular command lives–was it in the Layout menu or the Arrange menu? Fumbling from menu to menu is time-consuming. With *Icon-It,* you can convert hard-to-find menu items to continually visible icons (see "Quick Clicks").

Even if you're intimately familiar with the contents of a program's menus, *Icon-It* can save you time. It's no secret that many menu commands have no ⌘-key equivalents, forcing you to open a menu and select the command. I've worn a groove in my mouse pad from zipping up to *MacWrite*'s File menu to select Save (serves me right for using *MacWrite,* you're undoubtedly thinking, but it suits my needs; heck, I still drive a '63 Dodge Dart, too). *Icon-It* lets you line up a collection of up to 27 frequently used menu commands and assign a pictograph to each. You can then click the commands from a central location–the icon bar–much faster than pulling down menus and choosing commands. And *Icon-It* doesn't stop at commands; you can create macros with a program like *Tempo* or *Excel* and assign each macro an icon.

In addition to increased speed, *Icon-It* offers convenience. People have different working styles; few users operate a program in exactly the same way. The ability to pull together a set of often-used commands or macros lets you customize a program to fit the way you use it.

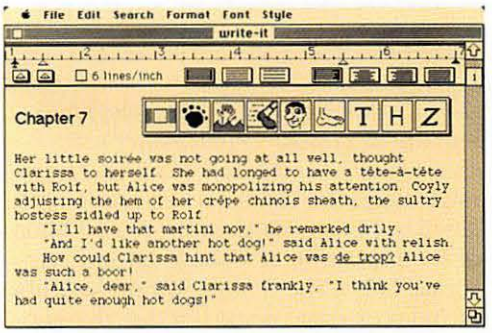
### I Think Icon

I would be straying dangerously close to hyperbole if I said that installing an icon bar is simplicity itself–but it's not hard. You drag the *Icon-It* application into a System Folder to install it as a desk accessory. Select *Icon-It* from within an application to open the Icon Bar Editor, a dialog box in which you set attributes such as the size and number of icons you want and the screen position of the icon bar. Then paste in or draw your icons and assign them functions by selecting the appropriate

menu items. Macros are assigned in a similar manner, by selecting their keystroke combinations.

*Icon-It* offers enough flexibility to suit many tastes and working styles. For example, if you're more verbally than artistically inclined, you can insert words rather than pictures in an icon bar. You can add, edit, or delete icons at any time. In fact, you can delete the entire icon bar if you wish—temporarily via a close box, or permanently with the Clear command.

I have only a few complaints about *Icon-It.* The documentation is a mite skimpy, but adequate overall. The program's icon-drawing module is on the sparse side as well, comprising a pencil and commands to nudge the picture horizontally or vertically; it's a minor flaw, however, since icons can be drawn in other programs and pasted in. More serious is the fact that *Icon-It* doesn't run under *Switcher* or MultiFinder; however, Olduvai says that incompatibility will be corrected in version 1.01 (free to registered owners). Finally, I found myself wishing for a vertical configuration of the icon bar in addition to the horizontal layout (vertical bars are planned for a future release).




***Quick Clicks***

*In this somewhat facetious application of* Icon-It, *I've iconized several* MacWrite *menu commands: Close; Print; Save; Quit; Open Headers; Open Footers; and Times, Helvetica, and Zapf Chancery.*

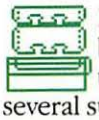
*Icon-It* shares something with the latest Mac craze, *HyperCard:* both provide simple means by which programming illiterates can venture into the inner workings of a program and add personal touches. I've added *Icon-It* to my collection of Mac utilities.—*Erfert Nielson*

See *Where to Buy* for product details.

# Number, Please

***QuickDex** 1.4*

***Rolodex-type desk accessory.*** ***Pros:*** *Fast and convenient; allows eight files open simultaneously; text-file format for data manipulation by other programs.* ***Cons:*** *Lacks some desirable bells and whistles.* ***List price:*** *$35.* ***Requires:*** *512K.* ***Copy protection:*** *None.*



I asked myself "Who would ever buy a desk accessory Rolodex-type program?" There are already several such programs in the public domain, and one of the first distributed *HyperCard* applications was the name-and-address stack called *NoteBook.* I gave Greene Inc.'s *QuickDex* a try anyway and soon found myself using it regularly.

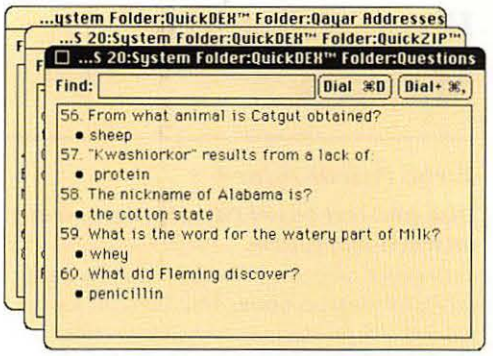
*QuickDex* stores names, addresses, notes, and other information in a file card format. The program installs like any other desk accessory. But you should also create a separate folder on your start-up disk to contain the program and card decks. Once you've opened the card decks, the application will always remember where to find them (unless you move them).

When you select *QuickDex* from the Apple menu, an inverted question mark appears on the menu bar. Beneath the menu functions appear the titles of up to eight card decks. When you first open *QuickDex,* the card deck that comes first alphabetically in the list is automatically highlighted.

You move forwards or backwards through a card deck one card at a time. You can also search for a character string by typing a sequence into the Find window. *QuickDex* prompts you to save your work when you close or quit if you haven't saved while editing the card deck.

Adding a new card is simple: just type ⌘-A or select "Add a new card" from the *QuickDex* menu. Entering data for a new card is also straightforward. Each card holds up to 512 characters. If you exceed that number, the program sends you a warning message. You can continue to enter text and save the card, but the data entered after character 512 will not be saved.

The *QuickDex* master disk's print utility offers several printing options. One allows you to print one card at a time. Another gives you the ability to sort by the first or last word on the first line of the card.




***Card Decks Open***

*The desk accessory* QuickDex *permits up to eight card files to be open at the same time.*

### Use It for Anything

I reformatted a 249K *FileMaker Plus* address database in text format, did a minimal amount of manipulation with a word processor, and reopened it as a *QuickDex* file. The address card deck is now only 48K. Instead of opening a separate database, I can retrieve the name or address of a client or supplier in three seconds. The program retrieves information so fast that I soon discovered some useful, if unusual, applications. One of the local BBSs I call regularly is based on a trivia quiz. I have now set up a card deck containing all the questions I've received so far, with the answers. When I am asked the same question again, I simply bring up the Questions screen, search for the question, and cut and paste the answer back to the host computer.

Another feature of *QuickDex* is the ability to dial a number directly from the desk accessory. Simply search for the number you want and highlight it. Click the Dial button to call that number either with a modem or by holding the phone close to the Macintosh speaker. If you have an older Macintosh with the speaker near the back, you may not have much success with the second approach.

Unquestionably, *QuickDex* is fast, compact, and convenient. Adding a new card to a *QuickDex* card deck takes about 100 bytes; adding the same amount of information to a *HyperCard* stack requires about 1100 bytes. Furthermore, unlike *HyperCard, QuickDex* is available anytime as a desk accessory. It's a simple-to-use, convenient program that I wouldn't be without now.—*Kenn Chapman*

See *Where to Buy* for product details.

# Pascal for the Masses

***Turbo Pascal Tutor*** *1.0*

***Disk-and-text-based Pascal programming instructional system.*** ***Pros:*** *Huge, well-written manual; dozens of examples; good section on Toolbox usage.* ***Cons:*** *A bit daunting for beginners—the product necessarily reflects the complexity of Mac programming.* ***List price:*** *$69.95.* ***Requires:*** *512K.* ***Copy protection:*** *None.*

Pascal is the most popular teaching language for small computers, and it occupies a central position in Macintosh programming. Not only is Pascal the "natural language" of the Mac—the Toolbox's routine-set resembles a large Pascal program—but most of the Mac's early applications were based on *MPW Pascal* from Apple.

Borland International's *Turbo Pascal for the Mac* is an attempt to build on the success of *Turbo Pascal for the IBM PC. Turbo Tutor,* a follow-up product, dwarfs its PC-based cousin by trying to provide a complete training course for everyone from beginners to semi-pro developers.

It very nearly succeeds. There is still, alas, no real substitute for a thorough reading of *Inside Macintosh,* volumes 1 through 5, and a year or so of struggle down in the $A000 neighborhood. But *Turbo Tutor,* an interactive tutorial, will lead newcomers one step at a time through the process of cobbling together simple Mac applications.

The tutorial is divided into five sections: an introduction for absolute novices (no programming background at all); a programmer's guide (assumes some computer knowledge); a review of advanced Pascal features (queues, lists, trees, and sorting/searching); a look at Mac hardware and the Toolbox; and a detailed study (more than 300 pages in the manual) of programming techniques for resources, QuickDraw, windows, menus, dialog boxes, and other Macintosh essentials. A compilable tutor program at the heart of the system lets you browse the sample programs, from the beginner's "hello, world" level to the full-bells-and-whistles MacTypist.

**For Example**

One of the distinctive features of Mac programming is that no amount of standard documentation ever really seems to explain how to use the Mac's distinctive resources. Borland's approach to solving this problem, which is *Tutor's* learn-by-doing technique simply presents a large library of separately compilable program fragments that new programmers can cut and paste into their own applications. In the figure, the text in the Control Window was added to the skeleton window-program listing.

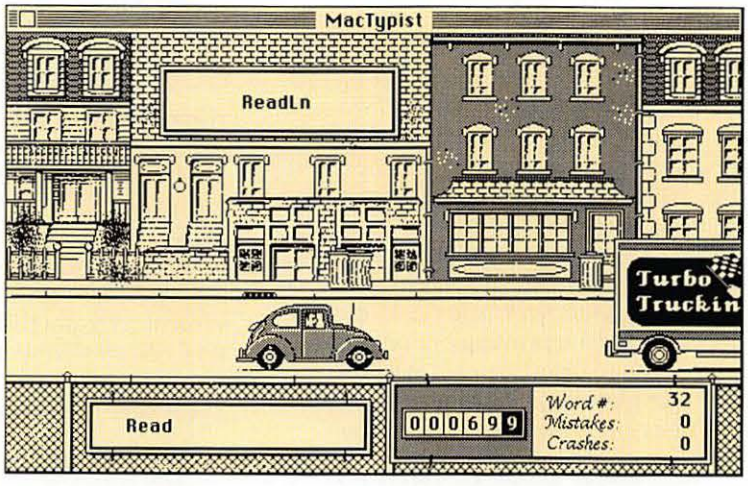
A programmer can start with a textbook-style program (in which the computer serves as a dumb terminal), then systematically add menus, dialog boxes, graphics, and scrollable windows by selecting and modifying *Tutor* examples. Not only is this easier than writing full-featured applications from scratch, but it also squashes 90 percent of the inadvertent bugs (typos, unbalanced parentheses, unmatched begin-end combinations, and so on).

*Turbo Tutor* illustrates the use of individual program elements in MacTypist, a graphics-filled, animated typing game in which the typing examples are all Pascal keywords (see "Racing against Time"). A little study of this program shows how to use *MacPaint* screens as backgrounds for animation, introduce sound effects into applications, and install menus in a fairly fancy program. Even if you're not trying something this ambitious, you can at least see the way good Mac programs are constructed block by block. There's probably no really easy way to become a hotshot Mac programmer, but Borland's *Tutor* scheme is as easy as it gets.—*Charles Seiter*

See *Where to Buy* for product details.

***Racing against Time***

Turbo Tutor's *fanciest example, MacTypist, shows the use of* Paint *screens as a background for an animated game. If you can follow this example through to the end, you will have learned 90 percent of the tricks involved in Mac programming.*




# The Contender

***SemperSoft Modula-2*** *1.04*

**MPW *Modula-2 compiler tool, libraries, and utilities.*** ***Pros:*** *Compact code generation; convenient extensions for Macintosh programming.* ***Cons:*** *Shortage of on-disk examples.* ***List price:*** *$125 ($285 includes* MPW *2.0 base).* ***Requirements:*** MPW *1.0 512K;* MPW *2.0 1MB.* ***Copy protection:*** *None.*

Semper Software has entered the Macintosh market with a Modula-2 development system integrated into the *Macintosh Programmer's Workshop* (*MPW*). *SemperSoft Modula-2* fully implements the Modula-2 language as specified by Niklaus Wirth in the third edition of *Programming in Modula-2* (Springer-Verlag, 1985). The *SemperSoft* package also includes extensions and libraries that support Macintosh software development as described in *Inside Macintosh* (volumes 1-4, 1986, volume 5, 1987, Addison-Wesley). Apple's *MPW,* distributed by the Apple Programmer's and Developer's Association, comprises a shell environment, a 68000 macro assembler, a Pascal compiler, and a C compiler.

*MPW Modula-2* has been implemented by two outside developers: Semper Software and TML (see *Reviews, Macworld,* December 1987). At first glance, there is little to distinguish the two compilers. Both run as tools in the *MPW* shell environment and are complete implementations of the Modula-2 language definition. TML's product is less expensive, its

documentation is better, and the company has an established reputation in Macintosh development. *SemperSoft*'s compiler generates smaller and slightly faster programs, and the system comes with more useful utilities (a source reformatter and a tool to automate makefile generation). Either product might well suit your needs, and the choice is likely to be difficult.

*SemperSoft* includes a flex-bound, 107-page indexed manual and two 800K disks containing the compiler, two utilities, two examples, most of the libraries described in *Programming in Modula-2*– plus libraries that allow access to the routines described in *Inside Macintosh*.

The first thing you'll notice about the Macintosh-specific libraries is that there are only three of them: InsideMac (which covers the original three volumes of *Inside Macintosh*), Volume IV, and Volume V. This arrangement of materials makes the task of writing modules easier. With *SemperSoft Modula-2* you need to know only which ROM (64, 128, or 256) supports a routine or database, whereas with *TML Modula-2* you need to know which manager defines it. You'll also spend less time compiling with *SemperSoft*, since fewer files need to be opened and closed. The modules not included in the program have complete analogs in *Inside Macintosh:* FileSystem, Windows, GraphicWindows, TextWindows, CursorMouse, and Menus.

Semper has also implemented a few extensions in its compiler. In addition to the standard BITSET (16-element set), Semper has a standard LONGSET (32-element set). Also predefined to the compiler are PASCHAR (equivalent to the CHAR type of *MPW Pascal*), STRING (up to 255 characters), and STRING[x] (up to *x* characters in length). The SYSTEM module (hardware-specific procedures and types) includes a generic HANDLE type, which is compatible with any type that is a pointer to a pointer. This HANDLE type lets you avoid type coercion of many variables when calling routines such as GetDItem, HLock, and SetIText. SYSTEM also supports both CODE and INLINE procedures, allowing low-level access from your modules. The availability of type coercion via type-transfer functions answers my only personal complaint about the TML implementation– the requirement to use VAL functions at every turn, rendering the code less readable and more tedious to write. As with the TML package, *SemperSoft* enables you to generate "textbook" programs, full Macintosh-style applications, desk accessories, or stand-alone code modules such as Window (or Control) Definition Procedures, and you may call and link with modules written in *MPW Pascal* and *Assembler*.

Semper's first release is compatible with the Macintosh II, as well as the SE and Plus, but does not generate 68020-specific code, nor does it directly support the 68881 floating-point processor. Support of the 68881 is under development.

## SemperSoft Modula-2 Benchmark

**Time to generate application from raw sources (in seconds)**

| Program | SemperSoft Modula-2 | TML Modula-2 | LightSpeedC 2.11 |
|---|---|---|---|
| Skel | 17 | 19 | 17 |
| MultiSkel | 43 | 46 | 35 |
| EventLog | 32 | 34 | 25 |
| DumbEdit | 31 | 34 | 24 |

**Generated application size (in bytes)**

| Program | SemperSoft Modula-2 | TML Modula-2 | LightSpeedC 2.11 |
|---|---|---|---|
| Skel | 6231 | 8562 | 6980 |
| MultiSkel | 11,911 | 14,391 | 11,955 |
| EventLog | 16,236 | 19,623 | 16,522 |
| DumbEdit | 16,443 | 23,079 | 15,662 |

**50 Iterations of the Sieve of Eratosthenes (in seconds)**

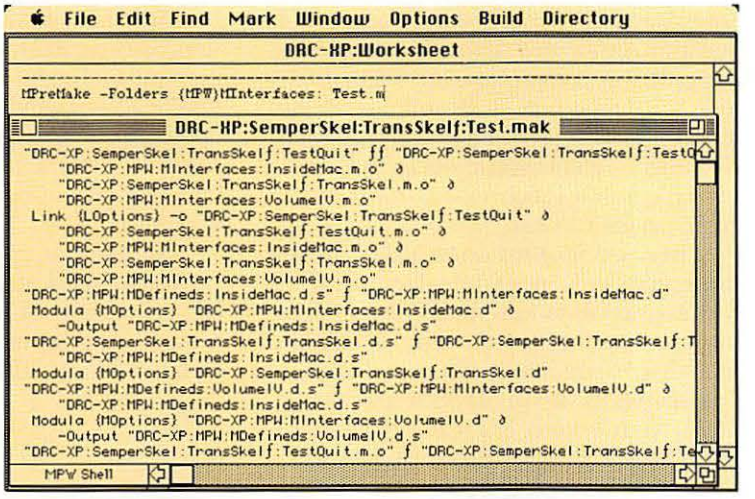
| | |
|---|---|
| SemperSoft Modula-2 | 3.2 |
| TML Modula-2 | 3.2 |
| LightSpeedC 2.11 | 3.2 |

*All four programs are based on the public domain package TransSkel. These provide a transportable skeleton for application development. Skel is an implementation of Apple's Skel example program. MultiSkel is a multiple window application with a scrolling, noneditable text window; a region manipulation window; a nonscrolling text-edit window; and a graphics demonstration. EventLog uses TransDisplay and produces a log of all events (or a designated subset). DumbEdit is a simple text editor based on TransEdit.*

*All benchmarks were run on a 5MB Mac II with internal 80MB hard disk (60MB free).* SemperSoft *and* TML Modula-2 *were run under* MPW *2.0.*

***MPreMake Tool Output***

*This output was generated by the MPreMake tool of* SemperSoft Modula-2 *for the* Macintosh Programmer's Workshop.



In *MPW,* there is a utility named Make that uses a makefile of module dependencies to automate the process of compiling, linking, and resource-combining. The creation of these files is a somewhat tedious process, and the syntax is an arcane holdover from Make's roots in UNIX. *SemperSoft* provides a tool, MPreMake, that will analyze your source and build the makefile for you. The company also provides a source reformatter (including sources), MFormat, which produces a consistently indented and formatted output source file from an input source file.

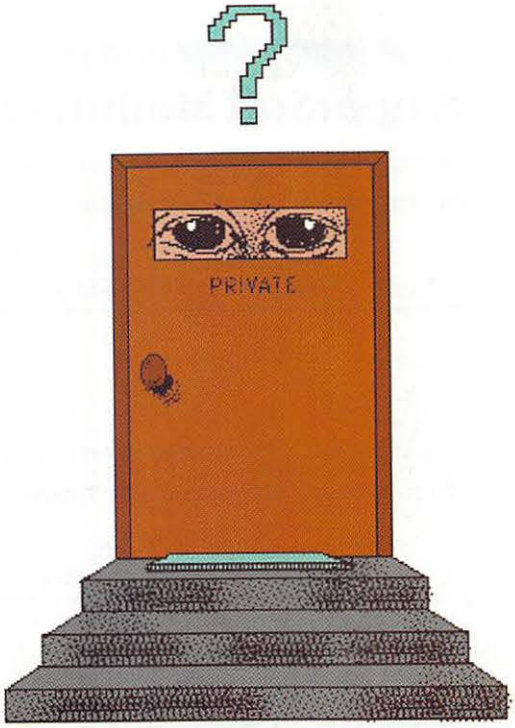
The well-written manual by Russell Schnapp includes a Read Me file and contains all the information necessary for a Modula-2 programmer to be productive. The table of contents is accurate and the index useful. The shortage of on-disk example programs is the only serious drawback to the documentation, one that Semper promises to have rectified by the time you read this. The revision will include full source to a Modula-2 implementation of Paul DuBois's TransSkel package (a non-object *MacApp*).

### Neck and Neck

As the accompanying benchmark table reveals, the turnaround time for creating an application is much less in *LightSpeedC* than with either Modula-2 compiler, primarily because *MPW* is slow; Modula-2 times are consistent with those of *MPW Pascal* and *MPW C.* In terms of execution speed, the differences between the programs is minor. Semper wins in terms of code size, comparing favorably with *TML Pascal,* long the leader in that category.

Semper's product is a well-implemented, efficient Modula-2 development package, that produces applications competitive with, and often superior in size and performance to, the other language systems available to Macintosh developers. If you're a serious programmer, this product is an excellent investment; however, the *MPW* environment is not for the casual hobbyist. TML has a directly competing product for one-half the price, but TML's product is a little less convenient for the programmer and does not generate as compact an application. I have both of them, I use both of them, and frankly, I'm very glad I don't have to make a choice between them.—*Dennis Cohen*

See *Where to Buy* for product information.




# Secure and Simple

***Sentinel** 1.1*

***Document encryption and password protection.*** ***Pros:*** *Secure data encryption and password protection; simple operation and excellent online help; standard Macintosh interface; works with* TOPS, AppleShare, *hard disk partition.* ***Cons:*** *Stand-alone application not DA.* ***List price:*** *$149.95.* ***Requires:*** *Mac 512KE.* ***Copy protection:*** *None.*

*Sentinel,* from SuperMac Software, provides password protection and encryption for data files using either the National Bureau of Standards Data Encryption Standard (DES) or SuperMac's fast SuperCrypt proprietary algorithm. Although a devoted superhacker can probably compromise any security system, *Sentinel* is practically immune to interference. This program doesn't just hide documents, it encrypts them so that not even file utilities such as *Mac-Tools* and *Fedit* can gain access.

Because *Sentinel* doesn't alter the way the System and Finder treat document files, the program functions reliably in any Macintosh operating environment, including hard disk partitioning utilities and local area networks such as *AppleShare* and *TOPS.* And *Sentinel* is so easy to use that referring to its well-written manual soon becomes unnecessary.

### Sensitive Environments

*Sentinel* tracks all unlocked files by automatically recording them in a directory file called a *work set.* The work set tracks which files are unlocked even after you restart the Mac. You can lock or unlock files in a work set individually. In addition, you can remove documents from a work set so that *Sentinel* no longer tracks them. More important, the work set allows you to rapidly lock or unlock a group of files without knowing each file's protection status, encryption method, or folder location. This feature is especially useful when you must relock files in a hurry.

Users can define and name personal sets of files and specify an encryption method (DES or SuperCrypt) for each file in a set. All files in a set, however, must reside on the same disk (or disk partition), and they must share the same password.

If a work set file is moved from its original folder, *Sentinel* "grays out" that file. The next time the set is locked, grayed-out files are dropped from the set. As long as the file is locked, it's still protected. The only problem, however, is that if a sensitive file has been unlocked and then moved from its original folder, that file will not be automatically relocked with the other files in the work set.

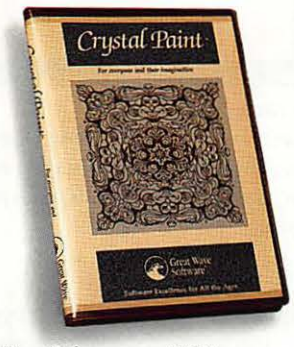
### The Mac Look and Feel

Locking a document superimposes a lock and chain, complete with animation and sound, on the original document icon. The icon remains recognizable, and it still appears in its original folder. Double-clicking a locked document launches *Sentinel* and brings up the Unlock password dialog box. When *Sentinel* presents the standard select file dialog in response to a Lock or Unlock command, double-clicking a document name selects that document and calls up the password dialog.

*Sentinel*'s few departures from the standard Mac interface work so well that they still feel right. Documents in a *Sentinel* work-set window automatically clean up when deletions or additions are made. To select documents, the cursor activates highlighting without repeated clicks of the mouse.

My only complaint is that *Sentinel* runs as an application rather than a DA. File encryption and decryption shouldn't require quitting an application to visit the Finder. While MultiFinder will alleviate this

# Overnight Delivery.




**Great Wave Software ... NCP**
*Crystal Paint*–Innovative graphics program which uses symmetry to create intricate and imaginative works of art..... $32.

KidsTime *(educational, ages 3-8)* ..... 27.
Crystal Paint *(graphic symmetries)*..... 32.
ConcertWare+ *(music composition)* ..... 39.
Art of the Fugue *(Bach)*, Classical Selections, Instrumental Favorites, Early Music, Popular Music.....*each* 12.
ConcertWare+ MIDI..... 79.

**Greene, Inc. ... NCP**
QuickDEX *(address book)* ..... 24.

**Hayden Software ... CP**
MusicWorks *(songs for your Mac)* ..... 29.
Score Improvement for the SAT or ACT .... 58.

**Ideaform ... NCP**
MacLabeler or DiskQuick..... 28.

**Imagine ... NCP**
Smart Alarms *(DA reminder system)* ..... 37.
Multi-user Appointment Diary ..... 99.

**Infosphere ... CP**
LaserServe *(network software)* ..... 64.
ComServe *(NCP, modem sharer)*..... 124.
MacServe *(network software)* ..... 164.

**Innovative Data Design ... NCP**
MacDraft 1.2A *(requires 512k)*..... 157.

**Kensington**
Graphic Accents *(250 illustrations)*..... 29.
Professional Type Fonts for Text..... 29.

**LaserWare ... CP**
LaserWorks *(requires 512k, LaserWriter)*... 195.
LaserPaint *(requires Mac Plus)*..... 315.

**Layered ... CP**
Notes for...Excel, Microsoft Works, PageMaker, Ready,Set,Go!3 or Word ..... *each* 41.

**Legisoft/Nolo Press ... NCP**
WillWriter 2.0 *(prepare your own will)* ..... 30.

**Letraset ... NCP**
Image Studio *(image processing software)* $289.
Ready,Set,Go! 4.0 *(page layout)* ..... 289.

**Linguist's Software ... NCP**
Tech *(1000 different symbols)* ..... 59.
*FOREIGN LANGUAGE FONTS*
SuperFrench/German/Spanish..... 39.
SuperGreek New or Old Testament..... 79.
MacCyrillic..... 39.
MacHieroglyphics, MacKana/Basic Kanji, MacSemitic/Coptic/Devanagari, MacKorean, MacThai, SuperGreek, MacHebrew
MacAkkadian..... *each* 59.
MacHebrew Old Testament..... 79.
MacGreek/Hebrew/Phonetics..... 89.
MacChinese..... 115.
LaserFrench/German/Spanish ..... 79.
LaserGreek or LaserHebrew..... 79.
Laser Transliterator ..... 79.
LaserTech ..... 79.
LaserCyrillic ..... 115.

**Living Videotext ... NCP**
More 1.1C *(outlines, windows, & tree charts)*175.

**Lundeen & Associates ... NCP**
WorksPlus Spell 1.1 ..... 49.

**MacroMind ... NCP**
VideoWorks II *(animation tool)* ..... 119.

**MacroPac International ... NCP**
101 Macros for Excel ..... 45.

**Magnum ... CP**
McPic Vol. 1 or Vol. 2 ..... 29.
The Slide Show Magician 1.3 ..... 35.
Natural Sound with cable & editor..... 89.

**Micro Analyst ... NCP**
Mac Zap *(recover crashed hard disks)*..... 39.

**Microlytics ... NCP**
Word Finder *(synonym finder)* ..... 39.

**Microsoft ... NCP**
Basic Interpreter 3.0..... 62.
Chart 1.02 *(42 chart styles, CP)*..... 72.
Multiplan 1.1..... 110.
File 1.05..... 110.
Basic Compiler 1.0 ..... 119.
Fortran 2.2 *(compiler)* ..... 169.
Works 1.1 *(integrated tool)*..... 185.
Excel 1.04 *(power spreadsheet)* ..... 224.
Word 3.01 *(word processor)* ..... 239.

**Migent ... NCP**
In House Accountant *(small business)* .... 119.

**Miles Computing ... NCP**
Mac the Ripper Vol. 3 *(req. Paint program)*.. 27.
Orchestra of Fonts Vol. 4 *(30 different fonts)* . 27.
Peoples, Places & Things Vol. 5..... 27.

**Mindscape ... NCP**
The Perfect Score: SAT *(CP)* ..... 47.
ComicWorks *(create your own comics)* .... 47.
GraphicWorks 1.1 *(newsletters & posters)* .. 87.

**MindWork Software ... NCP**
MindWrite 1.1..... $169.

**Monogram ... NCP**
Forecast *(tax planning)*..... 40.
Dollars & Sense *(home, small business)*.... 81.
Business Sense *(full-featured)* ..... 289.

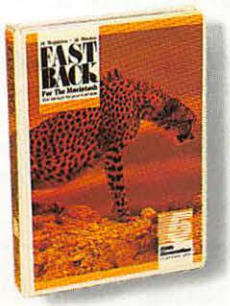
**Nantucket ... NCP**
McMax *(dBASE III compatible)* ..... 189.

**Nashoba Systems ... NCP**
FileMaker Plus *(feature-packed database)* 149.

**North Edge Software ... NCP**
Timeslips III *(time & expense tracking)*.... 119.

**Odesta ... NCP**
Double Helix II *(relational, custom menus)* 349.
Multi-User Helix *(requires 512k)*..... 429.

**Olduvai Software ... NCP**
DA-Switcher *(unlimited desk accessories)* .. 26.




**Fifth Generation Systems ... NCP**
*Fastback Mac*–A Meg-a-minute. Backup from hard disk to floppies by volume, selected files, or changes only. Restores disks, too ..... $59.

Post ART *(clip art, 3 disk set)*..... 36.
Icon-It! *(create custom icon bars)*..... 41.
Read-It!TS *(OCR software for Thunderscan)* 99.
Read-It! *(300 dpi OCR software)* ..... 199.

**OWL International ... NCP**
Guide *(hypertext, free-form info)* ..... 77.
Guide Envelope System..... 99.

**Palantir ... CP**
MathFlash or WordPlay..... 26.
MacType *(typing instruction)*..... 32.
inTalk *(communication to emulation, NCP)*.. 99.

**Passport Designs ... 90 days**
Passport MIDI Interface ..... 95.
Mastertracks Pro ..... 259.

**PBI Software ... NCP**
HFS Locater *(DA organizer for HFS)* ..... 26.
HD Backup *(supports MFS, HFS)* ..... 28.

1-800/Mac&Lisa 790C

# MacConnection™

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problem for many users, desk accessories are still convenient–especially for users whose Macs don't have the memory required to run MultiFinder.

Overall, however, *Sentinel* provides a simple, effective security tool that does exactly what it claims to do and does it well. *–Larry-Stuart Deutsch*

See *Where to Buy* for product details.

# A Database Construction Kit

***Inside Out*** *1.0*

***Programming tool for database development.*** ***Pros:*** *Allows rapid programming of custom database applications.* ***Cons:*** *For experienced programmers only.* ***List price:*** *$395 to create single-user programs; $595 to create multiuser programs; $200 annual support/license for developers marketing applications commercially.* ***Requires:*** *512K to 1MB, depending on language; hard drive recommended; works with* MPW, Lightspeed, TML, *or* Turbo Pascal *and* Lightspeed C. ***Copy protection:*** *None.*

As the Macintosh moves into the business mainstream, development of database products is on the rise. *Inside Out,* from Shana Enterprises, is a set of programmer's tools for developers who write customized database applications in C or Pascal. *Inside Out* produces compact programs that execute faster than applications created in large, self-contained environments such as *4th Dimension* and *dBASE Mac.* If you make a living writing applications for clients who need special databases, *Inside Out* is just what you need.

### Bytes and Pieces

The elements of an *Inside Out*-based application are the application code itself, the *database schema,* which specifies the use of *Inside Out*'s routines, and the data itself. In the application code, the programmer decides which database functions to implement and designs the database's screen display. To define the database schema (a formal, logical definition of the data), the programmer calls *Inside Out*'s setup program and specifies the data-access method appropriate for different types of data in the application.

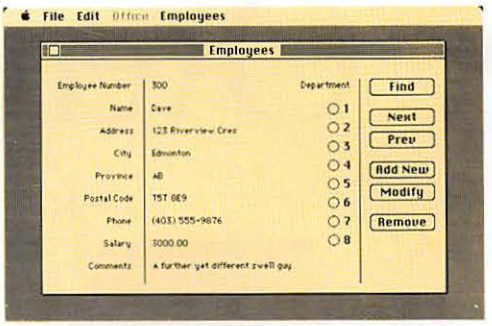
*Inside Out*'s unique automatic data-access feature works with three kinds of data: structured record files, unstructured files, and static blocks (files with just one record). An inventory application, for example, might store items as structured records; odd data, like picture files, as unstructured records; and miscellaneous entries (company address, report headers) in static blocks. After the data has been completely defined in terms of files and their relations, *Inside Out* generates Pascal or C code, to support data access in the application program, and produces a database schema resource for installation in the application program's resource fork. *Inside Out* documents its work to an extent that will amaze programmers used to other database toolboxes (see "An Inside Look").

*Inside Out* also offers features that go beyond simple database definition. They include routines for file encryption/decryption, compression/decompression, and automatic generation of error statements, as well as provision for file locking/unlocking in multiuser environments. Complete, working sample programs illustrate the use of most of the program's advanced features.

The main advantages of *Inside Out* programming over the run-time modules associated with power databases such as *Helix* or *Omnis 3* are efficiency, speed, and scope. *Inside Out*'s sample application Employee, a reasonably full-featured business database, compiles to a mere 100K in *MPW Pascal* (see "The Gang's All Here"). In fast insertion mode, placing 100 records into an existing database of 5000 records (approximately eight 10-byte fields per record) takes 0.8 seconds per record; Find and other functions are similarly quick. *Inside Out* also supports databases of up to 256 gigabytes, which would call for 128 files of 2 gigabytes each. It's safe to say that the programmer faces no practical limits on database size or functionality.

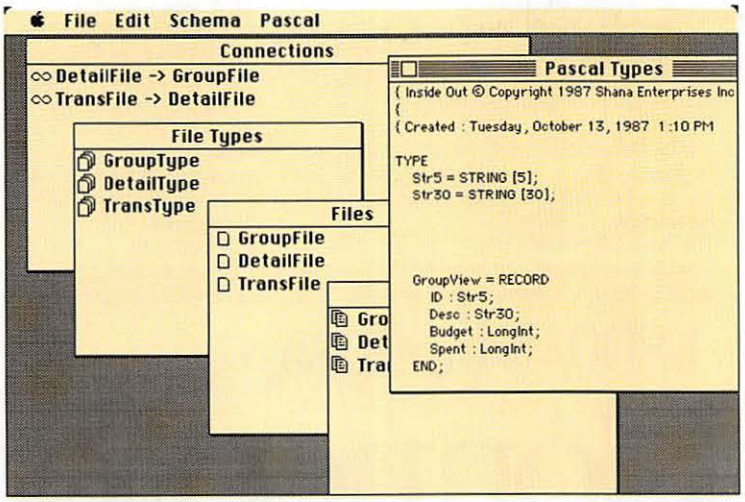
Pascal and C programmers can create fast, compact database applications with *Inside Out.* While it's definitely not the next programming challenge for someone who has just worked through *Turbo Tutor,* anyone who earns a living writing custom applications should consider *Inside Out* as a serious alternative both to reinventing the database wheel and to relying on commercial database packages. *–Charles Seiter*

See *Where to Buy* for product details.




***The Gang's All Here***
Inside Out*'s database schema method for structuring data allows programmers to create databases such as this one, with just a few pages of original code.*

***An Inside Look***
Inside Out *provides a detailed record of file creation and usage within an application, listing source code (here in a Pascal-based version of* IO*) for the programmer's examination.*



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**Activision ... NCP**
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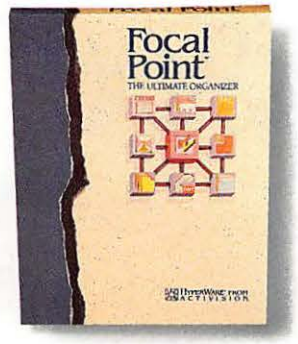
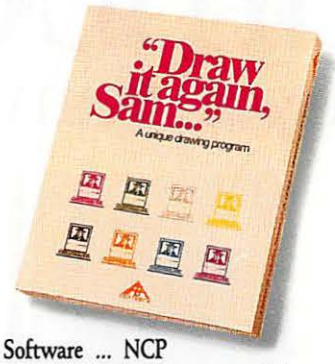
Business Class *(atlas, req. Hypercard)* . . . . 32.
Focal Point *(organizer, req. Hypercard)* . . . 65.
**Aegis Development ... NCP**
Doug Clapp's Word Tools . . . . . 42.
**Affinity Microsystems ... NCP**
AffiniFile *(DA filer)* . . . . . 49.
Tempo *(power user's macro utility)* . . . . . 54.
**Allan Bonadio Associates ... NCP**
Expressionist *(equation processor)* . . . . . 52.
**ALSoft ... NCP**
DiskExpress *(maximize disk performance)* 26.
Font/DA Juggler . . . . . 26.
**Altsys ... NCP**
FONTastic Plus *(advanced font editor)* . . . . 48.
Fontographer *(LaserWriter font editor)* . . . 243.




Activision ... NCP
*Focal Point*—Links up with Hypercard to store and retrieve day-to-day tasks, ideas, etc. Includes To-Do lists, calendars, even a phone dialer $65.

**Ann Arbor ... NCP**
FullPaint *(advanced Paint program)* . . . . . 49.
**Ashton-Tate ... NCP**
dBASE Mac 1.0 *(relational, req. MacPlus)* 299.
**Batteries Included ... NCP**
Thunder! 1.23 *(spelling checker)* . . . . . 31.
Battery Pak *(9 desk accessories)* . . . . . 31.
Isgur Portfolio *(portfolio management)* . . . 129.
**Berkeley System Design ... NCP**
Stepping Out *(requires 512k)* . . . . . 55.
**Blyth ... NCP**
Omnis 3 Plus *(database generator)* . . . . . call
Omnis 3 Plus *(2-5 users)* . . . . . call
Omnis 3 Plus *(6-10 users)* . . . . . call
**Bogas Productions ... NCP**
Studio Session *(music creation)* . . . . . 57.
Country or Heavy Metal Rock Disk. . . . . 15.
**Borland International ... NCP**
Turbo Pascal Tutor . . . . . 46.
Numerical Methods Toolbox . . . . . 65.
Sidekick 2.0 *(includes MacPlan)* . . . . . 65.
Turbo Pascal *(HFS compatible)* . . . . . 65.
Reflex *(while supplies last)* . . . . . 59.
Reflex Plus *(info management tool)* . . . . . 179.




Aba Software ... NCP
*"Draw it again, Sam"*—Object-oriented drawing program with ten layered drawing planes. Produce color separations or cell animation. Includes graphic library . . . . . $95.

**BrainPower ... NCP**
Thinkfast *(memory improvement)* . . . . . 23.
StatView *(statistics package)* . . . . . 34.
Graphidex *(DA graphics organizer)* . . . . . 65.
DesignScope *(electronic circuit design)* . . 128.
MathView Professional *(num. analysis)* . . . 149.
StatView 512+ *(req. external drive, 512k)* . . . 178.
**Bravo Technologies ... NCP**
MacCalc *(easy to use spreadsheet)* . . . . . 79.
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Jam Session *(create your own tunes)* . . . . . 30.
Print Shop *(create cards and memos)* . . . . . 38.
Geometry *(over 350 problems!)* . . . . . 63.
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**CAMDE ... NCP**
Nutricalc *(diet & nutrition analysis)* . . . . . 49.
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**CasadyWare ... NCP**
Fluent Fonts *(two-disk set)* . . . . . 28.
Fluent Laser Fonts *(Vols. 1-15)* . . . . . *each* 46.
**CE Software ... NCP**
Calendar Maker *(create custom calendars)* 27.
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**Chang Labs ... NCP**
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Rags to Riches Payables. . . . . 123.
Rags to Riches Receivables . . . . . 123.
Rags to Riches Three Pak. . . . . 299.
The C.A.T. *(contacts, activities, time)* . . . . . 239.
Inventory Control . . . . . 239.
Professional Billing . . . . . 239.
Professional Three-Pak . . . . . 389.
Retail Business 3 Pak . . . . . 389.
**Concept Development**
MicroKitchen Companion. . . . . 29.
America Cooks: American, Chinese, French, Italian or Mexican . . . . . *each* 11.
**Cortland ... CP**
TopDesk 2.3 *(7 new desk accessories)* . . . . 33.
**Cricket Software ... NCP**
Pict-O-Graph *(color on the Mac II)* . . . . . 105.
Cricket Graph *(multiple windows)* . . . . . 124.
Cricket Draw *(advanced draw capabilities)* 175.
**Data Tailor ... NCP**
Trapeze *(spreadsheet, reqs. 512k)* . . . . . 159.

**DataViz ... NCP**
MacLink Plus *(transfer Mac/IBM data)* . . . $149.
**Davidson ... CP**
Math Blaster! *(grades 1-6)* . . . . . 27.
**Deneba Software ... NCP**
Merriam-Webster's Thesaurus . . . . . 36.
Comment *(electronic Post-It notes)* . . . . . 59.
Canvas 1.0 *(includes desk accessory)* . . . . 119.
**Dove Computer ... NCP**
RAMSnap *(RAM Disk/Disk Cache)* . . . . . 22.
**Dow Jones ... CP**
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Market Manager Plus . . . . . 159.
**Dubl-Click Software ... NCP**
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WetPaint Clip Art *(both volumes)* . . . . . 47.
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**Enabling Technologies ... NCP**
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Pro 3D *(3D shaded modeling)* . . . . . 199.
**Enzan-Hoshigumi USA ... NCP**
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**1st Byte ... CP**
Mad Libs *(party time)* . . . . . 14.
First Shapes *(all about sizes & shapes)* . . . . 32.
Kid Talk *("talking notebook")* . . . . . 32.
Math Talk *(math learning tool)* . . . . . 32.
Smooth Talker *(speech synthesis)* . . . . . 32.
Speller Bee *(spelling learning tool)* . . . . . 32.
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FileMaker 1.0 *(custom design reports)* . . . . . 49.
PowerPoint 1.0 *(presentations)* . . . . . 189.
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Comic Strip Factory *(create cartoons)* . . . . . 45.
**FWB Software ... NCP**
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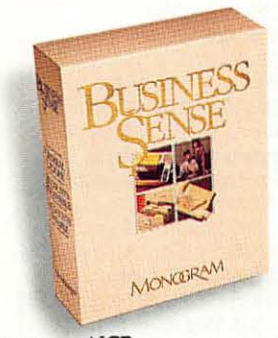
Hard Disk Partition . . . . . 37.
Hard Disk Util *(program backup)* . . . . . 55.
**Great Wave Software ... NCP**
TimeMasters *(learn about time, ages 4+)* 22.

BrainPower ... NCP
*StatView 512+*—Professional data analysis package. Includes multivariate and factor analyses, graphics, and more . . . . . $178.

# Latest versions.




Monogram ... NCP
*Business Sense*—Integrated accounting modules: General Ledger, Accounts Payable, Accounts Receivable, Invoicing, Budgeting and Payroll . . . . . $289.

**Personal Computer Peripherals ... NCP**
HFS Backup . . . . . 29.
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OverVUE 2.1 *(power-packed database)* . . . 149.
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Legal Billing *(attorneys to accountants)* . . . 379.
Legal Billing II *(full trust accounting)* . . . . . 569.
Project Billing *(architects to engineers)* . . . . 442.
**Silicon Beach Software ... NCP**
Silicon Press *(printer utility, 512k)* . . . . . 41.
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**SoftStyle ... NCP**
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**Solutions, Inc. ... NCP**
SmartScrap & The Clipper . . . . . 40.
Glue *(creates "print to disk" capability)* . . . . 40.
SuperGlue *(total graphic integration)* . . . . . 57.
The Curator *(graphic library)* . . . . . 81.
**Springboard ... CP**
Art a la Mac Volume 1 or 2 *(NCP)* . . . . . 23.
Early Games or Easy as ABC . . . . . 28.
Certificate Maker *(requires 512k)* . . . . . 35.
Certificate Library Vol. 1 . . . . . 19.
**SuperMac Software ... NCP**
SuperSpool 3.4 . . . . . 45.
Diskfit *(backup & restore utility)* . . . . . 57.
Network Diskfit *(automatic back up)* . . . . . 205.
Sentinel *(encryption)* . . . . . 85.
SuperLaserSpool . . . . . 85.
Multi-User SuperLaserSpool . . . . . 205.

**Survivor Software ... NCP**
MacMoney *(financial planner)* . . . . . $41.
**Symmetry ... NCP**
Acta 2.0 *(outline/writing desk accessory)* . . . 37.
PictureBase 1.2 *(clip art manager, 512k)* . . . 59.
**Target ... NCP**
Scoop *(composition & layout)* . . . . . 299.
**Think Educational ... CP**
MacEdge II *(math & reading)* . . . . . 28.
Mind Over Mac . . . . . 28.
**THINK Technologies ... NCP**
HFS Navigator *(search for buried files)* . . . . 35.
Laserspeed *(LaserWriter utility)* . . . . . 55.
Lightspeed Pascal . . . . . 65.
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CAPP's for Lightspeed C . . . . . 49.
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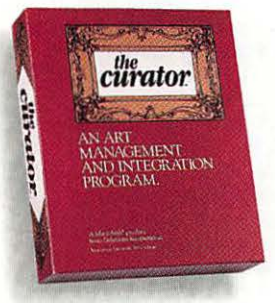
ClickArt Publications . . . . . 28.
ClickArt Letters Vol. 1 or 2 . . . . . 28.




Solutions, Inc. ... NCP
*The Curator*—Eliminates cutting and pasting into a scrapbook. Has a pictorial table of contents. Accepts artwork from PICT, TIFF, EPS, and MacPaint formats. . . . . $81.

ClickArt Holidays . . . . . 28.
ClickArt Business Images *(updated)* . . . . . 28.
Christian Images . . . . . 35.
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TML Pascal *(compiler, req. 512k)* . . . . . 59.
**TOPS ... CP** *(formerly Centram Systems)*
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Mac Robots *(pre-school program)* . . . . . 27.
Math Wizard *(math games, ages 5-10)* . . . . . 27.
Read-A-Rama *(reading, ages 5-8)* . . . . . 32.
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myDiskLabeler w/LaserWriter option . . . . . 35.
216 Smart Labels *(for ImageWriter)* . . . . . 15.
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**Baudville ... CP**
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*Scoop*—Create professional documents using this WYSIWYG desktop publishing package. Totally self-contained with paint, draw & spelling checker . . . . . $299.

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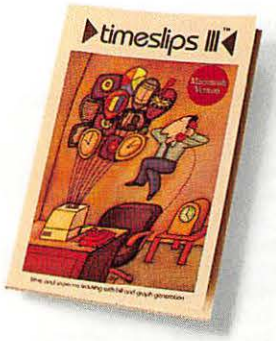
**Infinity Software ... CP**
Go *(4000-year-old strategy game)* . . . . . 22.
Grand Slam *(tennis, req. 512k)* . . . . . 27.

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Spellbreaker . . . . . 24.
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Zork Trilogy . . . . . 44.
Invisiclues Hint Booklets *(please specify)* . . . 6.
**MacroMind ... NCP**
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**Microsoft ... CP**
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Fool's Errand Hint Booklet . . . . . 7.
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Uninvited or Deja Vu . . . . . 30.
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**PBI Software ... CP**
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**Primera Software ... CP**
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**Psion ... CP**
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**Rainbird ... CP**
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**Sierra On-Line ... CP**
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**Simon & Schuster ... CP**
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**Sir-Tech ... CP**
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GATO *(submarine simulator)* . . . . . 26.
Orbiter *(space shuttle simulation)* . . . . . 26.
Falcon *(F-16 flight simulation)* . . . . . 27.
**XOR ... NCP**
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## HARDWARE

Manufacturer's minimum limited warranty period is listed after each company name. Some products in their line may have longer warranty periods.
NOTE: Some hardware items are available in either platinum or beige color. Please specify.

**20 Megabyte SCSI Hard Drive** . . . . . 529.
**45 Megabyte SCSI Hard Drive** . . . . . 1039.
**Apricorn ... 1 year**
ApriCord Mac *(for Mac 512k or Mac Plus)* 75.
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Emerald *(6 outlets; 6 ft cord)* . . . . . 36.
Sapphire *(3 outlets; EMI/RFI filtered)* . . . . . 47.
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MacSnap 548 *(512k to 2 Meg)* . . . . . 399.
MacSnap 548S *(512E to 2 Meg w/SCSI)* . . 469.
MacSnap 2S *(1 Meg to 2.5 Meg)* . . . . . 489.
MacSnap 4S *(1 Meg to 4 Meg)* . . . . . 969.
MacSnap 8S *(for Mac II, to 8 Meg)* . . . . . 1939.
MacSnap Plus 2 *(MacPlus to 2 Meg)* . . . . . 289.
MacSnap Plus 4H *(MacPlus to 4 Meg)* . . . . 969.
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Mouse Cleaner 360° . . . . . 15.
MacTilt or MacTilt SE . . . . . 69.
MacTilt *(for large monitor)* . . . . . 89.
MacBuffer 512k . . . . . 329.
MacBuffer 1024k . . . . . 429.
**Farallon Computing ... 1 year**
PhoneNET-AppleTalk 120 . . . . . 9.
PhoneNET PLUS *(DB-9 or DIN-8)* . . . . . 45.
**Hayes ... 2 years**
Smartcom II *(communications software)* . . 88.
Smartmodem 1200 . . . . . 299.
Smartmodem 2400 . . . . . 449.
MacPlus 1200 Package . . . . . 399.
MacPlus 2400 Package . . . . . 549.

Nantucket ... NCP
*McMax*—Run dBASE programs up to 4 times faster. Pull-down menus, an Assist mode, and English-like commands . . . . . $185.

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# No hidden charges.

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Appletalk Cable Clips or Connectors *each* $1.
External Drive Cover . . . . . 8.
Mouseway *(mouse tracking pad)* . . . . . 8.
Mouse Pocket *(for your idle mouse)* . . . . . 8.
Mac Plus/Mac SE Cover . . . . . 9.
ImageWriter II Dust Cover . . . . . 9.
Printer Stand . . . . . 17.
Mouse Cleaning Kit w/Mouse Pocket . . . . . 17.
Disk Drive Cleaning Kit . . . . . 20.
Tilt/Swivel . . . . . 22.
Universal Copy Stand . . . . . 23.
Polarizing Filter or Surge Suppressor . . . . . 34.
Apple Security Kit . . . . . 34.
Printer Muffler *(80 column)* . . . . . 38.
Printer Muffler *(132 column)* . . . . . 51.
Printer Muffler Stand *(80 or 132 column)* . . 25.
A-B Box *(for the Mac Plus)* . . . . . 64.
System Saver Mac or Control Center . . . . . 64.
Turbo Mouse *(for the MacPlus & SE)* . . . . . 83.
**Koala Technologies ... 90 days**
MacVision *(digitizer, includes MoreVision)* 175.
**Kraft Systems ... 1 year**
3-Button QuickStick . . . . . 39.
**Migent ... 1 year**
Pocket Modem *(ext. 300/1200 baud)* . . . . 169.
**Mirror Technologies ... 1 year**
Magnum 800 External Drive *(platinum)* . . 209.
MagNet 30x *(w/cable & print spoolers)* . . 799.
MagNet 40/40 *(40 Meg, 40 Meg tape)* . . 2139.
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A+ Mouse *(optical mouse)* . . . . . 79.
A+ Mouse ADB *(for Mac SE & II)* . . . . . 89.
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EasyNet *(AppleTalk network connector)* . . . 28.
**Orange Micro ... 1 year**
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MacBottom HD 32 Meg *(SCSI)* . . . . . 899.
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Optional built-in 1200 bps modems avail. call
MacBottom IHD-144 Meg *(for Mac II; 1 yr.)* 2195.
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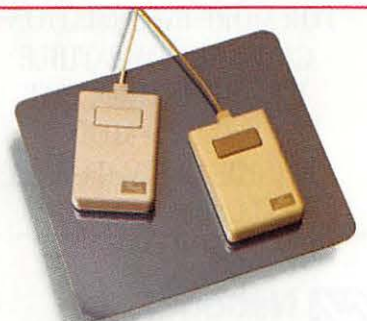
2400 Baud External Modem . . . . . 189.
**SoftStyle ... 90 days**
MacEnhancer *(for plotters to printers)* . . . . 159.



MSC Technologies ... lifetime
*A+ Mouse*—An all optical mouse with no moving parts. Lightning fast, exceptionally accurate cursor control. Includes mirror-like pad.
A+ Mouse . . . . . $79.
A+ Mouse ADB . . . . . $89.

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Mac II Power Accessory . . . . . 42.
**Western Automation**
DASCH RAMdisk 2000K . . . . . 399.

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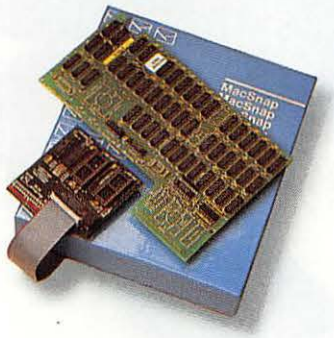
**Double-sided diskettes.**
**Sony** 3½" DS/DD Disks *(box of 10)* . . . . . 18.
**Fuji** 3½" DS/DD Disks *(box of 10)* . . . . . 19.
**MAXELL** 3½" DS/DD Disks *(box of 10)* . . . 20.
**Verbatim** 3½" DS/DD Disks *(box of 10)* . . . 20.
**3M** 3½" DS/DD Disks *(box of 10)* . . . . . 20.

**Single-sided diskettes.**
**Sony** 3½" SS/DD Disks *(box of 10)* . . . . . 13.
**Fuji** 3½" SS/DD Disks *(box of 10)* . . . . . 13.
**MAXELL** 3½" SS/DD Disks *(box of 10)* . . . 14.
**Verbatim** 3½" SS/DD Disks *(box of 10)* . . . 15.
**3M** 3½" SS/DD Disks *(box of 10)* . . . . . 15.




Dove Computer ... 90 days
*MacSnap 548S*—Take 2 giant steps forward: increase your memory to 2 Meg, and add a SCSI port. User installable. Req. 512E . . $469.

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**CompuServe**
CompuServe Information Service . . . . . 24.
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*Available in navy or platinum.*
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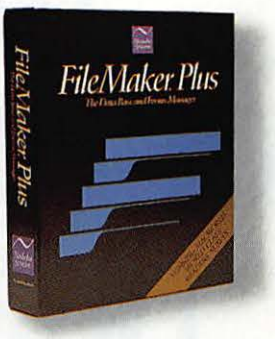
Teakwood Roll-top Case *(holds 45 disks)* . . 14.




Nashoba Systems ... NCP
*FileMaker Plus*—Database and forms management program. Performs calculations, summary reports, mail mergings, etc.. . . $149.

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*Available in a variety of colors.*
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*Available colors: black, blue, brown, green, orange, purple, red, yellow and silver.*
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Quality "MacAttire" nylon dust covers. . . 7-17.
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# We were ready for the Mac II almost before they were.

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National is the company you should think of for add-in products. Now, with our NS8/16 Memory Expansion Board. And in the future — you can expect to see a whole line of add-in products for the Mac II.

It's experience that lets us make a promise like that. So now that you have the Mac II ready to run, you know who can help you see how far it can go.

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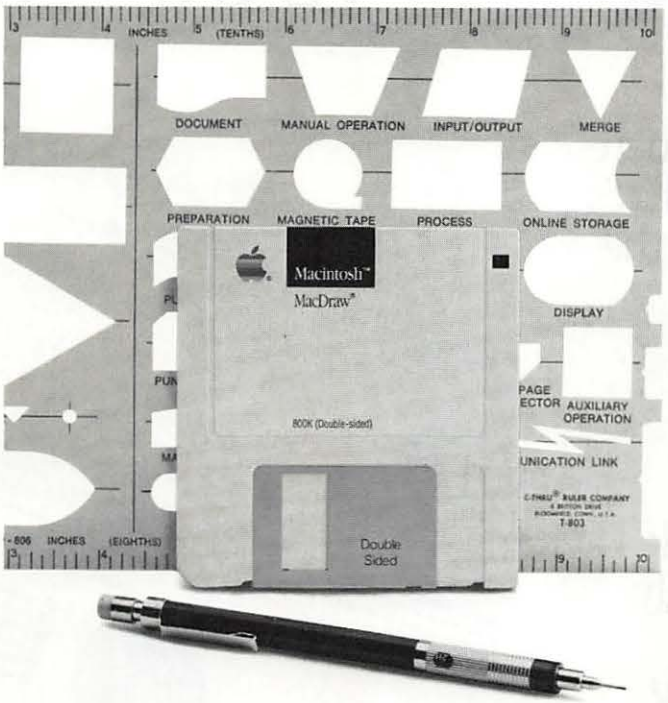
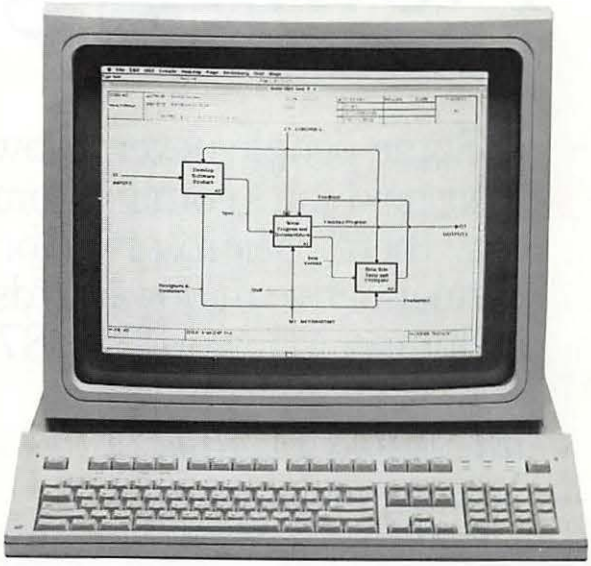
Circle 196 on reader service card

# If you just need a drawing tool, use one of these.




# If you need a design tool, use Design/PLUS.



A lot of tools can help you draw. But how many can help you design and keep track of complex system models?

Meta Software introduces Design/PLUS, the integrated text and graphics processor that helps you design systems, flow charts, organizational charts, computer programs, communications networks, production line process diagrams, business plans and more. Do it all faster and more efficiently than with manual tools or any other program.

Design/PLUS puts an end to time-consuming drawing and redrawing. Because it understands that objects in a diagram are related. Once you connect one object to another in a Design/PLUS diagram, it stays connected. If you move or resize an object, Design/PLUS automatically recreates all associated objects, arrows, and subordinate objects.

You can also create and edit text in your diagrams. And associate text with any object or connector. Even establish hypertext links that connect text across multiple pages.

As your model evolves, you can move detail to a subpage. In fact, you can build multi-level diagrams up to 9,999 pages. Design/PLUS automatically maintains the relationship and displays the hierarchy. So the big picture is easier to see. No matter how complex your model.

If that's not enough, Meta Software is offering MacDraw users a $25 trade-in allowance towards the purchase of Design/PLUS until May 31, 1988. See the coupon below for details. Wouldn't you rather spend your time designing instead of drawing?

**Trade in MacDraw for Design/PLUS and save $25.**

Simply send Meta Software your MacDraw disk and Design/PLUS registration card by May 31, 1988. We'll mail you a check for $25. For more information, write or call toll-free 1-800-227-4106. Inside Massachusetts, call 617-576-6920. Or simply return this coupon to: Meta Software Corporation, 150 CambridgePark Drive, Cambridge, Massachusetts 02140.

Name _____

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**Meta Software**

MacWorld 2/88

Available for the Macintosh™ Plus, SE, II. Macintosh is a trademark and MacDraw is a registered trademark of Apple Computer, Inc.

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# Nothing gets the jobs done

Some people never know where their next job's coming from. That's why there's Microsoft® Works, the winner of five major awards—including Macworld's 1987 and MacUser's 1986 *Integrated Product of the Year* awards.

Microsoft Works is a one-disk software program that gracefully integrates:

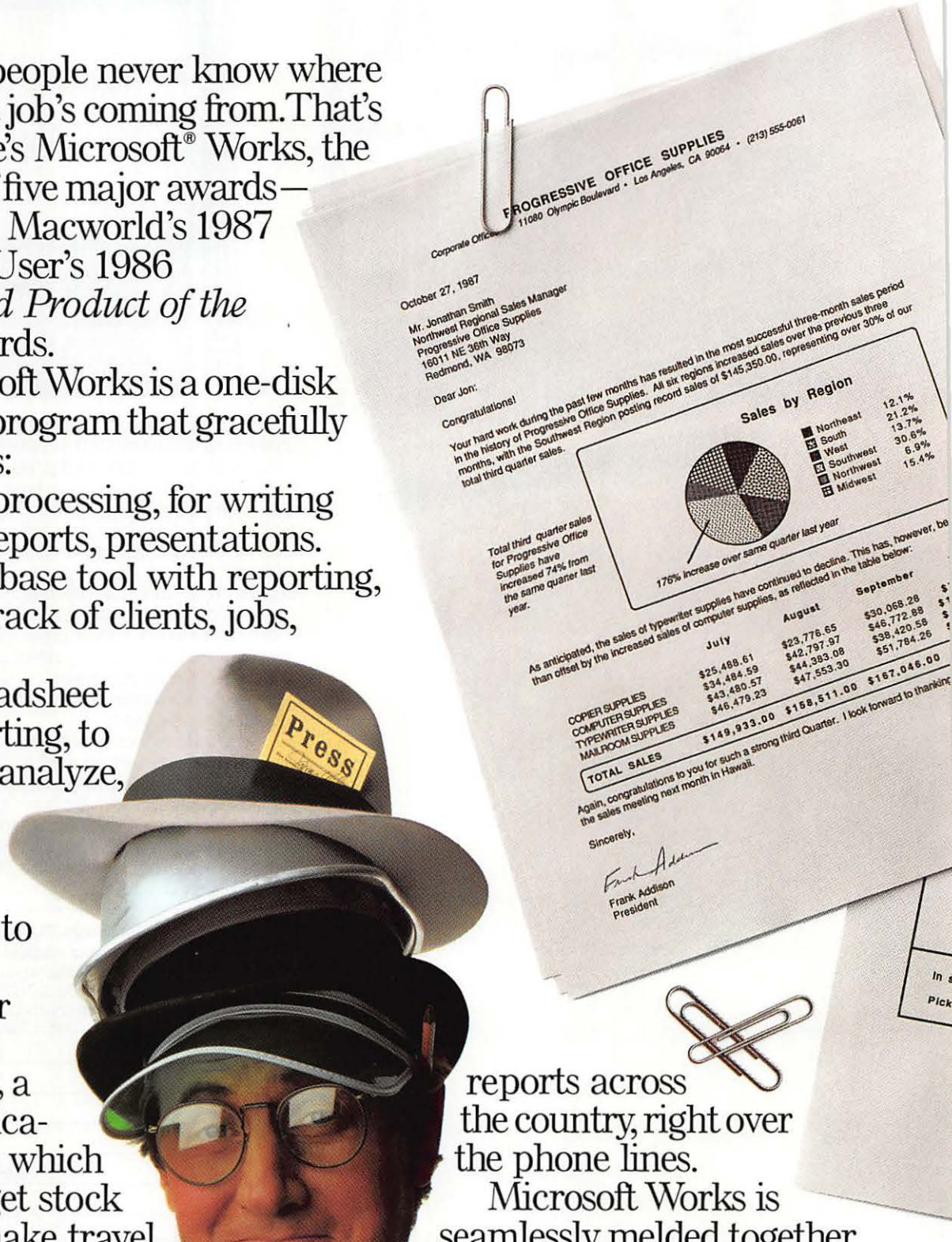
Word processing, for writing memos, reports, presentations.

A database tool with reporting, to keep track of clients, jobs, vendors.

A spreadsheet with charting, to compute, analyze, interpret, and then graph anything to do with finance or numbers.

Finally, a communications tool which lets you get stock quotes, make travel reservations, do research, and send reports across the country, right over the phone lines.

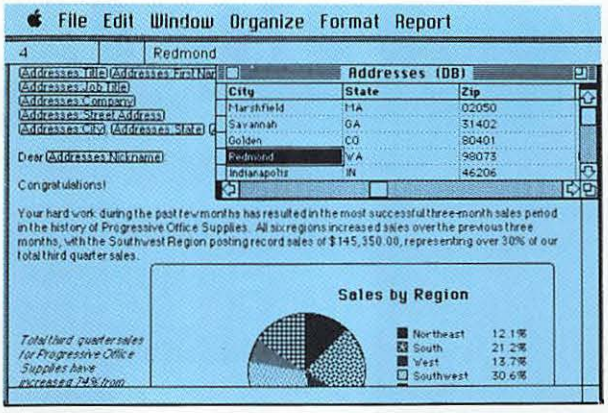
Microsoft Works is seamlessly melded together. You can have all four tools on screen at once. Jump instantly

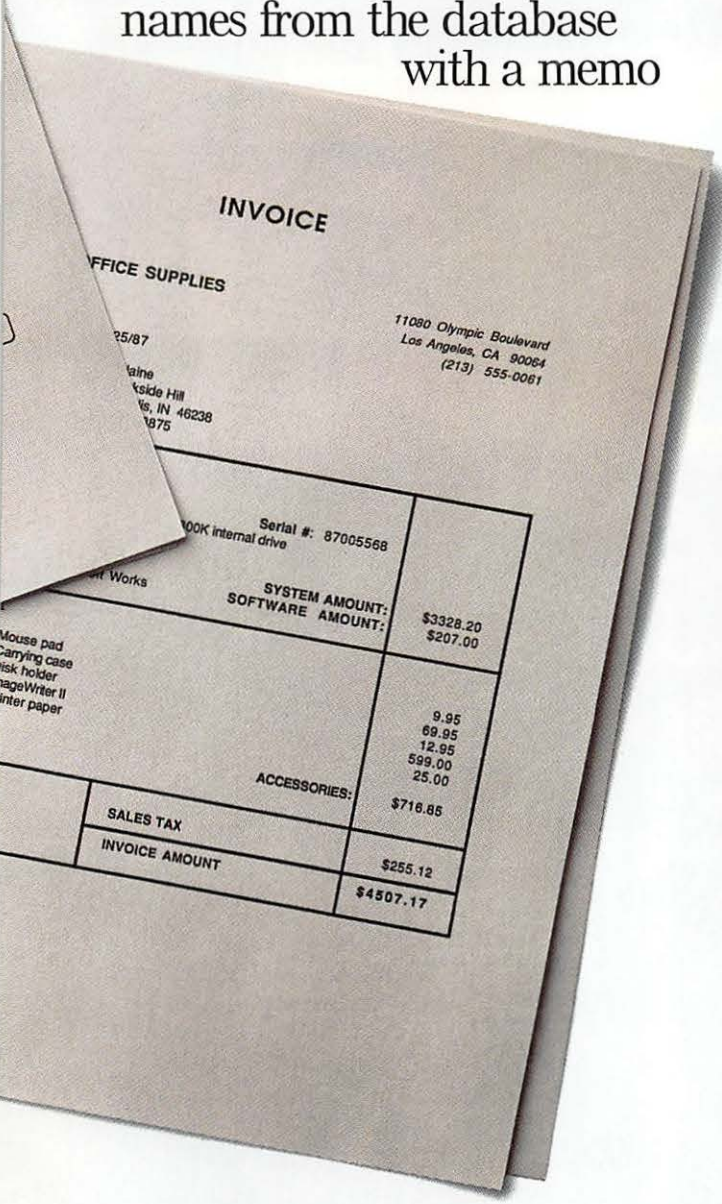


# ike Microsoft Works.

from one to another. And later combine work done in each part of the program on a single printed page.

This easy exchange of data makes jobs go faster and much, much easier. (Like form letters where you need to combine names from the database with a memo written in the word processor.)

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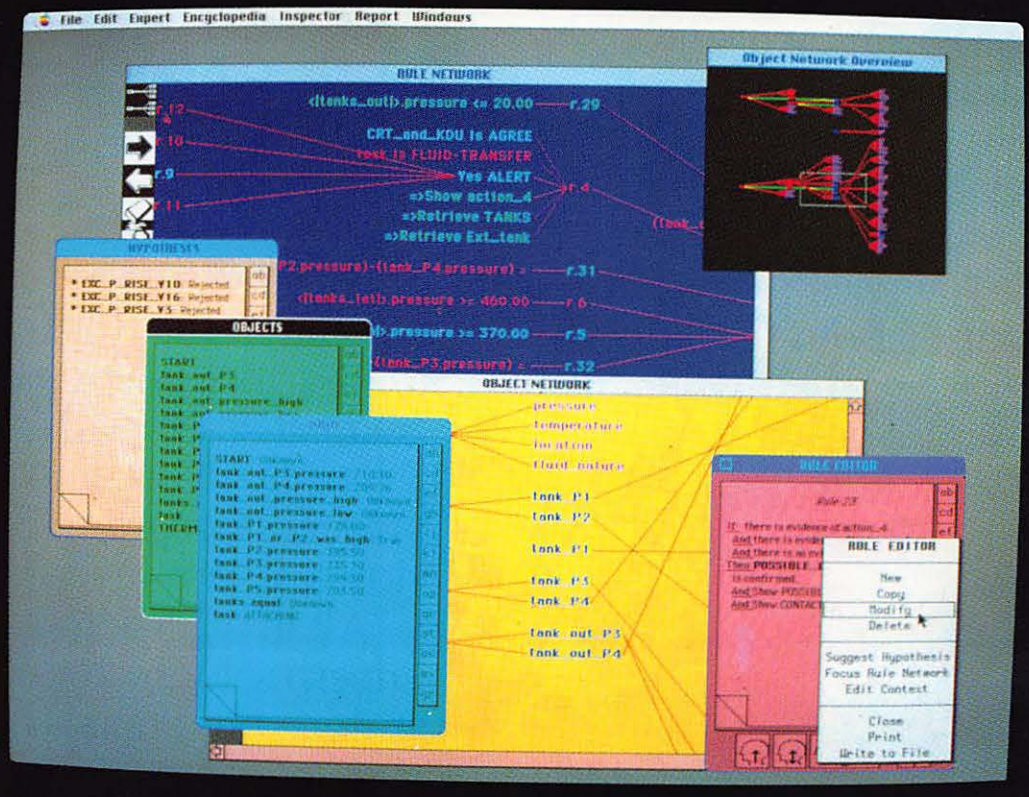
■ **EXPERT SYSTEM** □ HYBRID TOOL □ OBJECT AND RULE REPRESENTATION □ INCREMENTAL COMPILERS □ WRITTEN IN "C" ■ **RULES** □ PATTERN MATCHING □ INTEGRATED FORWARD AND BACKWARD CHAINING □ AUTOMATIC GOAL GENERATION □ NON-MONOTONIC REASONING □ DECLARATIVE ACCESS TO THE CONTROL STRUCTURE ■ **OBJECTS** □ CLASSES □ PROPERTIES □ META SLOTS □ MULTIPLE AND USER-DEFINED INHERITANCE □ METHODS ■ **INTERFACE** □ HYPERTEXT MODULE: AI VISION™ □ GRAPHIC KNOWLEDGE BROWSERS ■ **OPEN ARCHITECTURE** □ INTEGRATION WITH EXTERNAL PROGRAMS □ PARAMETERS PASSING □ LIBRARY AND CALLS □ INTEGRATED DATA BASES ACCESS □ EXCEL, LOTUS 1,2,3, DB III QUERIES □ EVENT DRIVEN □ EMBEDDED □ SUPPORT MULTITASKING FOR NEW MAC/OS ■ **HARDWARE** □ CROSS COMPATIBILITY □ MACINTOSH □ MAC +, SE, II □ IBM AT-PS/2 UNDER WINDOWS □ $5000 □ DEC VAX-STATIONS II, 2000, UNDER VMS/UIS □ $8000 ■ **DEC** □ NEXPERT IS A DIGITAL DISTRIBUTED SOFTWARE WITH DEC SUPPORT ■ **TRAINING** □ BECHTEL INFORMATION SERVICES OFFERS TUTORIAL AND TRAINING □ 415/768-1500 ■ **CLIENTS** □ LEADING CORPORATIONS USING NEXPERT TO SOLVE REAL-WORLD PROBLEMS □ HUGHES AIRCRAFT □ BOEING □ MARTIN MARIETTA □ ROCKWELL □ DEC □ LOCKHEED □ NASA □ SHELL OIL □ E.I. DU PONT □ THE EQUITABLE □ CHASE MANHATTAN BANK □ ELI LILLY □ PACIFIC BELL □ ARTHUR ANDERSEN ■ **FOR MORE INFORMATION** □ CONTACT NEURON DATA □ 444 HIGH STREET □ PALO ALTO, CA 94301 □ 415/321-4488




# on Macintosh II™

NEURON DATA

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**Circle 131 on reader service card**

# New Products

*Information on the Mac's latest software, hardware, and accessories*

***Edited by Eileen Drapiza***

**This section covers Macintosh products formally announced but not yet evaluated by *Macworld*. All prices are suggested retail. Please call vendors for information on availability.**

## SOFTWARE

**Adobe Stone Type Family** Three subfamilies: serif, sans serif, and informal. Each subfamily includes six typefaces. $275 per font. Adobe Systems Inc., 415/961-4400.

**Advsys—an Adventure Writing System** A program for creating interactive adventure-text games. Includes sample game. 128K min. memory. $9 plus $4 shipping. The Public Domain Exchange, 408/496-0624.

**Aldus FreeHand** PostScript drawing program. Includes color support, special effects, and advanced text handling. 1MB min. memory. $495. Aldus Corp., 206/622-5500.

**Beverly Hills** Shareware text fonts in 9, 10, 12, 14, 18, 20, 24, 28, 36, and 48 points. Includes math symbols and fractions. $10 with blank disk. Alan D. Hayman, 1425 S. Doheny Dr., Los Angeles, CA 90035.

**Colorizer** DA for Mac II adds color to graphics programs. $49.95. Palomar Software, Inc., 619/727-3922.

**Draw It Again, Sam** Object-oriented drawing program with unlimited graphics/text libraries and layering capability. 512KE min. memory. $150. Aba Software, 215/640-4770.

**Easy Slider** Allows creation of color slides from object-oriented graphics programs. Includes communications utility to modem files. 512K min. memory. $149.95. Management Graphics, 612/854-1220.

**EthInves** Shareware reference material for making socially conscious investments. Includes list of SDI and top-100 DOD contractors, list of companies doing business in South Africa, and copy of the Sullivan Principles and list of companies that have signed them. *MacWrite*-format files. Regular updates sent to registered owners. $10. Jerry Whiting, P.O. Box 20821, Seattle, WA 98102.

**JET (Julian Express Typesetting)** Software/service combination. Allows complete specifications of typesetting jobs, duplication/binding. Software quotes job costs. Requires 1200-bps modem. $295, including $100 service-cost rebate. Julian Systems, Inc., 415/686-4400.

**LBeam** Integrates text editor, geometry and load modelers, stiffness assembler, equation solver, graphics, and project management for plane-frame structural analysis. 512K min. memory. $149.95. Cognitive Computing, 604/669-9800.

**LPA MacPROLOG Student Edition** Uses built-in incremental compiler and a declarative graphics environment, which contains call-graph debugging facility. 1MB min. memory. $275. Programming Logic Systems, 203/877-7988.

**MacAtlas Paint Version** Set of clip-art maps that can be modified by any *Paint*-format program. Maps include U.S. by state, and world regions showing country borders. 128K min. memory. $49. MicroMaps, 609/397-1611.

**MacCourses** Additional golf courses for *MacGolf*. 512K min. memory. $34.95. Practical Computer Applications, 612/427-4789.

**MacTell** Communications software that allows access to more than 6000 Minitel services worldwide, as well as U.S. ASCII services. $97. Baseline, Inc., 212/254-8235.

**MASC (Macintosh Security Control)** Encryption system. 512K min. memory. $30. Creativity Plus Software, 415/631-0883.

**MicEdGames** Collection of five educational games for players over five years old. 128K min. memory. $29.95. MicEdWare, 517/799-1700.

**Microlawyer Legal Forms** On-disk library of more than 100 commonly used legal forms, stored as text files. Includes help manual. $59.95. Progressive Peripherals & Software, Inc., 303/825-4144.

**Microsoft Write** Word processor subset of *Microsoft Word*. Includes 80,000-word customizable spelling checker, context-sensitive help menu, automatic footnotes, multiple columns, on-screen Page Preview function, and seven file formats. 512K min. memory. $175. Microsoft Corp., 206/882-8080.

**Mishu** DA that lets you paste Chinese characters into *MacWrite* and *Cricket Draw* documents. 512K min. memory. $89; $59 with copy of valid student ID. Xanatech, Inc., 617/492-7463.

*(continues)*

# When you want to talk MacIntosh

## HARD DRIVES

**CMS**
Pro-20 SE/I ..... $499.00
Pro-40 SE/I ..... 999.00
Pro-43 SE/I ..... 699.00
MacStack 20 ..... 599.00
MacStack 43 ..... 899.00
MacStack 60 ..... 999.00
**Ehman Engineering**
20MB Hard Dive ..... 999.00
40MB Hard Dive ..... 1399.00
**Everex**
EMAC 20D ..... 599.00
EMAC 40D ..... 999.00
EMAC 91D ..... 1499.00
**Lowdown**
Lowdown 20 ..... 849.00
Lowdown 30 ..... 1099.00
**Mountain**
20MB With SCSI ..... 899.00
40MB With SCSI ..... 1499.00
**PCPC**
MacBottom HD21 ..... 859.00
Macbottom HD21M ..... 999.00
MacBottom HD32 ..... 999.00
MacBottom HD32M ..... 1199.00
MacBottom HD45 ..... 1399.00
MacBottom HD45M ..... 1499.00

**Proapp**
**Proapp 20S** **$699**
Proapp 40S ..... 1149.00

## DIGITIZERS/SCANNERS

**AST**
Turbo Scan ..... 1489.00
**Koala**
MacVision 72DPI ..... 219.00

## MODEMS

**Everex**
EMAC Md 2400 ..... $299.00
**Hayes**
Hayes Mac 1200 ..... 439.00

## DRIVES WITH TAPE BACKUP

**Everex**
EMAC 40/60 ..... call
EMAC 91/60 ..... call
**Mirror Technologies**
Magnet 40/40 ..... 2199.00
Magnet 85X ..... 3399.00

## FLOPPY DRIVES

**Ehman Engineering**
800K External ..... 199.00
**Mirror Technologies**
Magnum 800K External ..... 209.00

## MONITORS

**Mega Graphics**
Magascreen 2001 Video System ..... 1699.00
Megascreen SE Video System ..... 1599.00
Megascreen Plus Video System ..... 1599.00
**Network Specialties**
20″ Stretch Screen ..... 1599.00
High Top Full Page Display ..... call
**Proapp**
Eye Save Monitor ..... 319.00
**Radius**
Full Page Display ..... 1399.00
Two Page Display ..... 2199.00

**Sigma Designs 19″**
**Laserview SE** **1899**
Laserview II 19″ ..... 1999.00

## TAPE BACKUP

AST
AST 2000 ..... $1599.00
AST4000 ..... 4199.00
**CMS**
Tapestack 60 ..... 799.00
**Everex**
EMAC 60T ..... 1099.00

**Mountain Dual**
**20MB Removable Ber.** **$2199**
**Mountain**
20MB Removable Bernoulli ..... 1499.00
40MB 20/Removable Bernoulli ..... 2699.00

## MEMORY BOARDS

**Dove Computer**
MacSnap 524 ..... 179.00
MacSnap 524E ..... 159.00
Macsnap 524S ..... 229.00
Macsnap 548 ..... 389.00
MacSnap 548E ..... 379.00
MacSnap 548S ..... 449.00
MacSnap 548H ..... 639.00
MacSnap Plus 2 ..... 299.00
MacSnap Plus 2H ..... 499.00
MacSnap 2S ..... 499.00
MacSnap 4S ..... 999.00
**MacMemory**
E Machines Adaptor Kit ..... 119.00
Multisimms 2MB ..... call
Multisimms 4MB ..... call
Turbo Drive 40 SCSI ..... 1699.00
Turbo Max ..... 999.00
Turbo SE ..... 419.00
Maxplus Mega 2MB ..... 349.00
Maxram/Maxprint ..... 35.99
68881 Math Coprocessor ..... 369.00

**To Mac users, we are the new kid on the block. To more than 400,000 satisfied PC customers, we're an old friend.**

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# .....you want to talk to us.

## SOFTWARE

**Aegis Development**
Doug Clapps Word Tools.....$45.99
**Affinity**
Tempo.....55.99
**Altsys**
Fontastic Plus.....52.99
**Ann Arbor Softworks**
Full Write Aug.....169.00
Full Paint.....54.99
**Ashton Tate**
dBase Mac.....319.00
**Berkley Systems Design**
Stepping Out.....59.99
**Brainpower**
Stateview 512 Plus.....199.00
**Broderbund**
Print Shop.....39.99
**Central Point**
Copy II Mac.....23.99
**Cricket**
Cricket Graph.....119.00
Cricket Draw.....169.00
Statworks.....74.99
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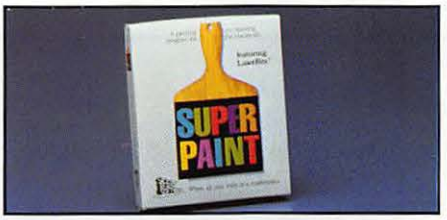
Trapeze.....169.00
**Data Viz**
MacLink Plus with cable.....129.00
**Deneba**
Coach.....$69.99
Coach Professional.....159.00
Comment 1.1.....69.99
Canvas.....159.000
**Firebird Liscensees**
Laser Author.....119.00

**Letra Set Ready•Set•Go 4.0** **$379**

## SOFTWARE

**Infosphere**
Intermail 7 Users.....259.00
**Innovative Data Design**
Mac Draft.....159.00
**Lundeen & Associates**
Works & Spell.....39.99
**Microsoft**
Works.....179.00
Multiplan.....109.00
Word 3.1.....239.00
File.....109.00
Excel.....219.00
Power Point.....279.00
**Neshoba**
File Maker Plus.....179.00




**Silicone Beach Super Paint** **$89**
**Silicone Beach**
Silicon Press.....49.99
**Software Discoveries**
Merge Write.....33.99
**Software Power Company**
Power Up.....39.99
**Software Supply**
Suitcase.....45.99
**SuperMac Software**
Super Spool.....49.99
Super Laser Spool.....99.99
Multi-User Laser Spool.....249.00
Disk Fit.....49.99
Multi-User Disk Fit.....249.00
Sentinel.....99.99
**Symetry**
Acta V 2.0.....59.99
**T/Maker**
Write Now.....99.99

## ACCESSORIES

**Allsop**
Disk File 10 Holds 10 3½" Micros.....$3.99
Disk File 30 Holds 30 3½" Micros.....9.99
Cleaning Kit for 3½" Disks.....15.99
**Curtis**
3 Outlet, Duplex/Filter.....48.99
6 Outlet, 6'Cord/Filter.....48.99
6 Outlet, 6' Cord/Duplex.....29.99
6 Outlet, Duplex/Wall.....49.99
Power Conditioner.....169.00
**Kalmar Designs**
Teakwood Disk Cabinet for 3½".....13.99
**Kensington**
Turbo Mouse.....77.99
Turbo Mouse ADB.....77.99
System Saver.....63.99
Tilt/Swivel.....21.99
Disk Drive Cleaning kit.....19.99
**Microcomputer Accessories Inc.**
MacIntosh Valet.....109.00
**PTI/Datashield**
S-85 Surge Protector.....59.99
S-100 Surge Protector.....69.99
Power Center 5 Switched outlets.....89.99
Power Center Modem Protection.....119.00
**Brother**
MacDriver for 512, 512E Plus.....99.99

## DISKS

**Maxell 3½" DS/DD Disks** **$19**
**Maxell**
Maxell 3½" SS/DD.....12.99
**Sony**
Sony 3½" DS/DD.....17.99
Sony 3½" SS/DD.....12.99

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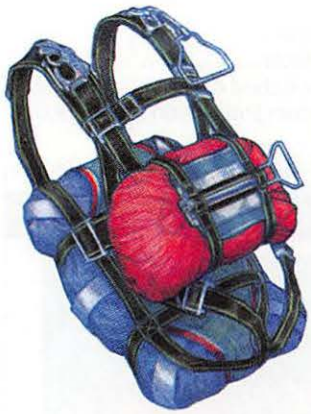
**POLICY:** Add 3% (minimum $7.00) shipping and handling. Larger shipments may require additional charges. Personal and company checks require 3 weeks to clear. For faster delivery use your credit card or send cashier's check or bank money order. Credit cards are NOT charged until we ship. Pennsylvania residents add 6% sales tax. All prices are U.S.A. prices and are subject to change and all items are subject to availability. Defective software will be replaced with the same item only. Hardware will be replaced or repaired at our discretion within the terms and limits of the manufacturer's warranty. We cannot guarantee compatibility. All sales are final and returned shipments are subject to a restocking fee.

# Tallgrass, The First Name In Tape Makes Backup Second Nature.



*Even people who jump out of airplanes believe in backup. They don't just carry a chute. They carry parachutes!*

**INTRODUCING THE TG-4040!** Designed specifically to meet the expansion needs of the complete Apple Macintosh™ family, by combining 40 Mbytes of tape backup and 40 Mbytes of optional hard disk in a completely integrated solution.

With backup that's every bit as sophisticated as you expect from Tallgrass, a leader in the mass storage marketplace for over 6 years.

Tallgrass has made backing up your Macintosh more practical than ever. And so simple, backing up data becomes second nature.

## APPLE ENDORSED IT. TALLGRASS MADE IT BETTER!

Apple endorsed the industry standard QIC 100 tape backup format which, by the way, Tallgrass invented. Now Tallgrass has made it even better.

## TWICE AS FAST.

Our tape drive works double-time, backing you up twice as fast as our closest competitors. Including Apple. But the Tallgrass 4040 will slow down, if need be, to read an Apple tape. And we'll guarantee that compatibility.

## WITH OR WITHOUT DISK.

Our high performance disk won't slow you down either. Plus, only Tallgrass offers you the ability to add the hard disk at a later date. With or without disk, it's the only solution flexible enough to grow as your business grows.

## A TRUE 40 MB OF TAPE BACKUP.

Most competitors won't allow you to back up the full capacity of your 40 Mbyte disk. Tallgrass corrects this problem by providing a formatted tape capacity of over 42 Mbytes. A unique tape overflow feature allows you to back up disks of even larger capacities.

## WHEN YOU CARE ABOUT YOUR DATA, BACK IT UP.

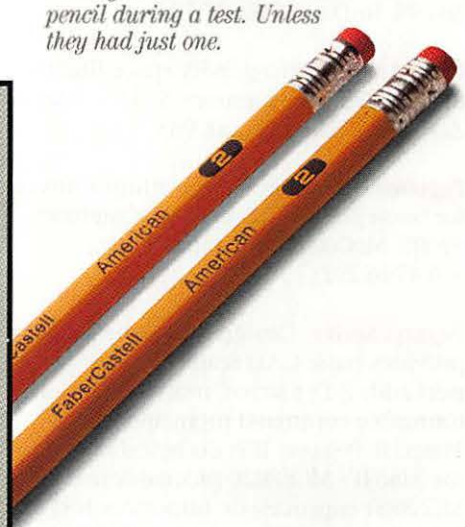
When the lights come back on, your data may not. That's why Tallgrass took the industry's most reliable medium—magnetic tape—and perfected a format that's becoming an Apple standard.

*How should you feel about tape backup? Take the spare tire out of your trunk for a month and see if that bothers you.*

*Breakthrough: We store 40 Mbytes of backup on this tiny tape cartridge, with legendary Tallgrass simplicity and reliability.*

*You think they filmed 22 years of Lassie with just one dog? Never. There were always at least two backup Lassies in the wings.*

*Nobody ever broke their No. 2 pencil during a test. Unless they had just one.*



***The TG-4040 is available in Apple platinum or beige.***

***This Apple "sider" fits neatly beside your Apple for easy tape access. An ideal companion for your Mac Plus, Mac SE and Mac II.***

## THE SIMPLER, THE BETTER.

Tallgrass provides the solution with software that's smart enough to keep things simple. Yet with the features all systems should have, but don't.

- User-friendly icon-interface software.
- Mirror image, file-by-file and volume backup modes.
- Automatic, unattended backup operations. Set it once and forget it.
- Incremental or modified file option backs up only files that have been changed since the previous backup.
- SCSI interface for compatibility with all internal and external hard disks for the Macintosh.
- Apple Tape Backup 40 SC,™ Apple Share™ and A/UX™ compatible.

## TALLGRASS BACKS *YOU* UP WITH SERVICE AND SUPPORT.

Tallgrass has been backing its products since 1981, a statement that very few of our competitors can make. Our reputation for service and support is second to none. And you can be sure we'll be here to back you up as you move forward.

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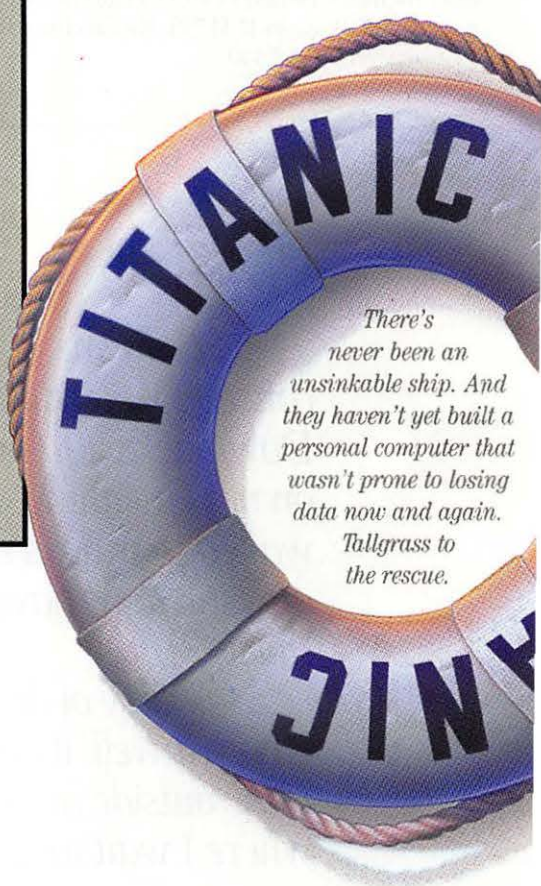
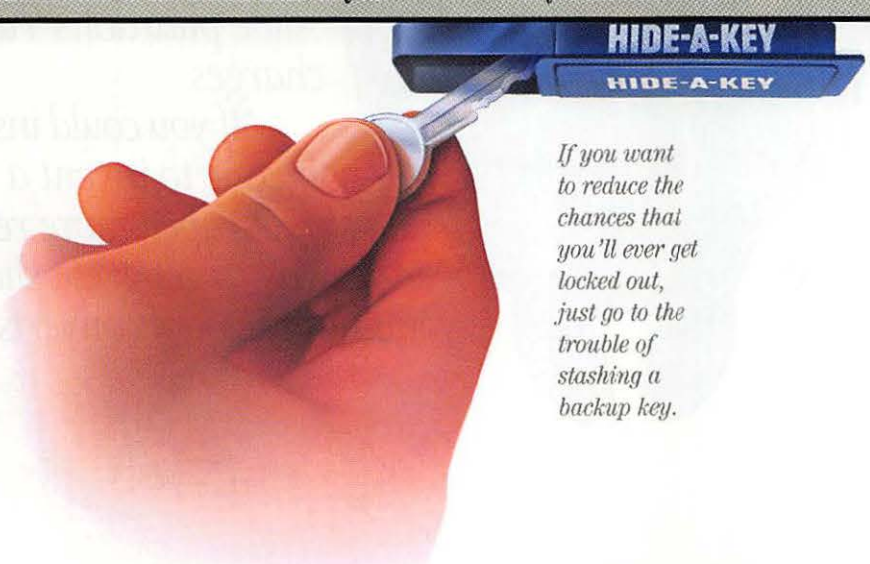



*There's never been an unsinkable ship. And they haven't yet built a personal computer that wasn't prone to losing data now and again. Tallgrass to the rescue.*




*If you want to reduce the chances that you'll ever get locked out, just go to the trouble of stashing a backup key.*

**Circle 6 on reader service card**

Macintosh, Apple Tape Backup 40 SC, Apple Sha and A/UX are trademarks of Apple Computer, Inc.

**OmniBackup/Restore** Use any Finder-mountable volume (SCSI or serial hard disks, tape drives, floppies, removable media, hard disk partitions, and most network volumes) as a source or destination volume when making backups. 1MB min. memory. $84.95. NuData, 408/727-1049.

**Orbital Mech** Zero-gravity space-flight simulator. 512K min. memory. $34.95. Studio Zero, 800/752-9222, ext. 933.

**PageOne** Automated typesetting software for book publishing. 1MB min. memory. $2000. McCutcheon Graphics Inc., 416/479-9292.

**Pegasys Series** Design programs. Pegasys I provides basic CAD features. Pegasys Expert adds 3-D, macros, more menus, customizable command input and Bill-of-Material. Pegasys II is designed to utilize the Mac II's MC68020 processor and MC68881 coprocessor. Import/export from *AutoCAD* via DXF, and create PICT files for transfer to other Mac applications. 1MB min. memory. Pegasys I $695, Pegasys Expert $1295. Pegasys II $1795. IGC Technology Corp., 415/945-7300.

**Postcards** Clip-art collection includes wacky characters and creatures with various backdrops. Requires *MacPaint, FullPaint,* or *SuperPaint.* $29.95. Activision, Inc., 415/960-0410.

**Reduce** Interactive software for general mathematical computations. Used in such areas as quantum electrodynamics/chromodynamics, electrical network analysis, plasma physics, and engineering design problems. 1MB min. memory. Single-machine license $495. Northwest Computer Algorithms, 415/897-1302.

**Reports** Adds pull-down menus to *HyperCard* and extends its ability to produce detailed row-and-column reports as well as complex free-form output. 1MB min. memory; requires *HyperCard.* $99. Nine to Five Software, 317/887-2156.

**SewSoft Bodice** Uses ten personal body measurements to make patterns for tailored clothing. 128K min. memory. $59.95. Andros SoftWear, 415/728-3553.

**ShopKeeper** Integrated accounts receivable, billing, point of sale, inventory, invoicing, customer files. For small retail/service concerns. 512K minimum memory. $159. ShopKeeper Software, 904/222-8808.

**Spellswell Legal Dictionary** Contains over 20,000 legal words and abbreviations. Comes with dictionary-merge program and the standard 93,000-word *Spellswell* dictionary. 512K min. memory; requires *Spellswell.* $99.95. Working Software, 408/375-2828.

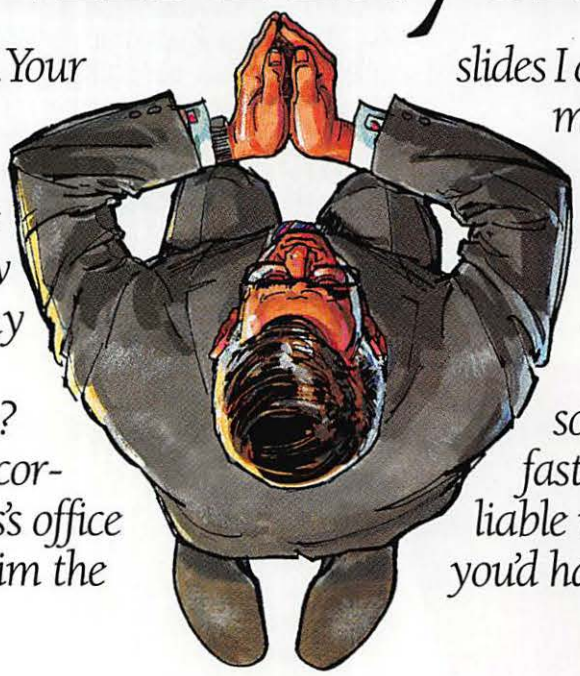
**Type** Teaches typing with real text and sentences. Includes arcade-style game and animated tutorial showing proper hand placement. 512K min. memory. $49.95. Brøderbund Software, 415/492-3200.

**VideoWorks II Accessory Series** *Clip Animation* consists of small segments of simple animation for business presentations. *Clip Charts* allows the user to custom-design an animated graph or bar chart with real numbers. *Clip Sounds* includes digitized files of sound effects and musical selections. *Movies* disk contains *VideoWorks II* movies. 512K min. memory; requires *VideoWorks II. Clip Animation, Clip Charts,* and *Clip Sounds* $59.95, *Movies* $49.95. MacroMind, 312/327-5821.


# The Prayer.

*"Hear me, Lord. Your concept of eternity? Down here it takes on new meaning. I've waited four days now and still don't have my slides.*

*"Valley of death? Know it well. It's the corridor outside my boss's office where I wait to tell him the slides I don't have for tomorrow morning's presentation will cost us $150 apiece—thanks to the slide pharaoh's 'rush' charges.*



*"If you could inspire someone to invent a faster, cheaper, more reliable way to get great slides, you'd have a lot of converts."*

**VSterm** Terminal-emulation and file-transfer program that allows the Mac to communicate with Wang's VS. 1MB min. memory. $195. MacSoft, 805/324-4291.

**xFer** File-sharing utility for Mac-to-Kaypro communication or vice versa. Text, MacBinary, and generic data-transfer modes. Access online disks from either computer. $99.95. Software Resources, 216/356-7264.

**Zihua Morse 2.0.** Step-by-step instruction in Morse code. Complete user control of speed settings. 512K min. memory. $39.95. Zihua Morse, P.O. Box 60763, Palo Alto, CA 94306.

## HARDWARE

**Brother M-1724L** 24-pin dot-matrix printer. 240 cps. $899. Brother International Corp., 201/981-0300.

**CompuSketch** Turnkey system for creating composite sketches of criminal suspects. Capacity to store more than 40,000 individual features and generate more than 100 trillion faces. Software $4000, complete system $6995. Visatex, 408/866-6562.

**Data Cell** High-capacity hard disks available in 90MB, 150MB, and 290MB sizes. 16.5-ms average access time. Includes memory management, backup, data recovery, partitioning disk optimizer, LaserWriter spooler, disk, and copying utilities. Features hardware SCSI selection and a DC fan. Data Cell 90 $2350, Data Cell 150 $3395, Data Cell 290 $7155. NuData, 408/727-1049.

**InnerDrive 50/II** Internal hard disk for the Mac II. 26-ms average access time. $999. Jasmine Technologies, 415/621-4339.

**Laser DataBank and Optofile** Laser DataBank provides 400MB of storage per 5¼-inch optical disk. Includes read/write drivers for using the optical-disk-like removable magnetic storage device. Optofile manages up to 66 optical disk cartridges and up to four drives in a jukeboxlike arrangement to provide 26.4 gigabytes of online storage. SCSI interface. Laser DataBank $3995, entry-level Optofile system $9950. Optotech, Inc., 303/570-7500.

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*(continues)*


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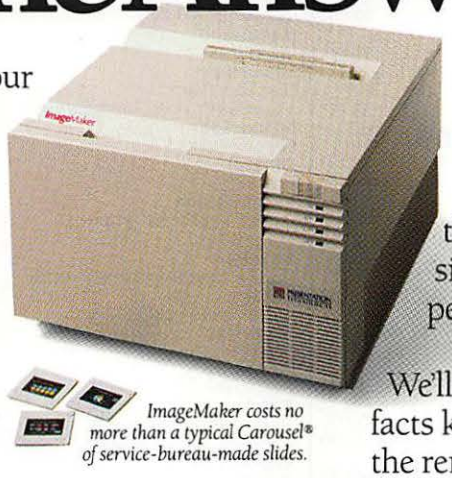

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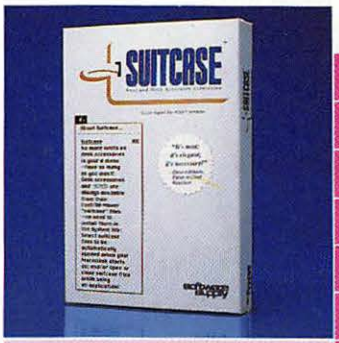


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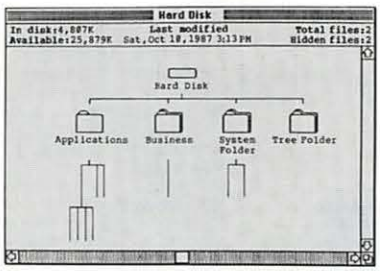


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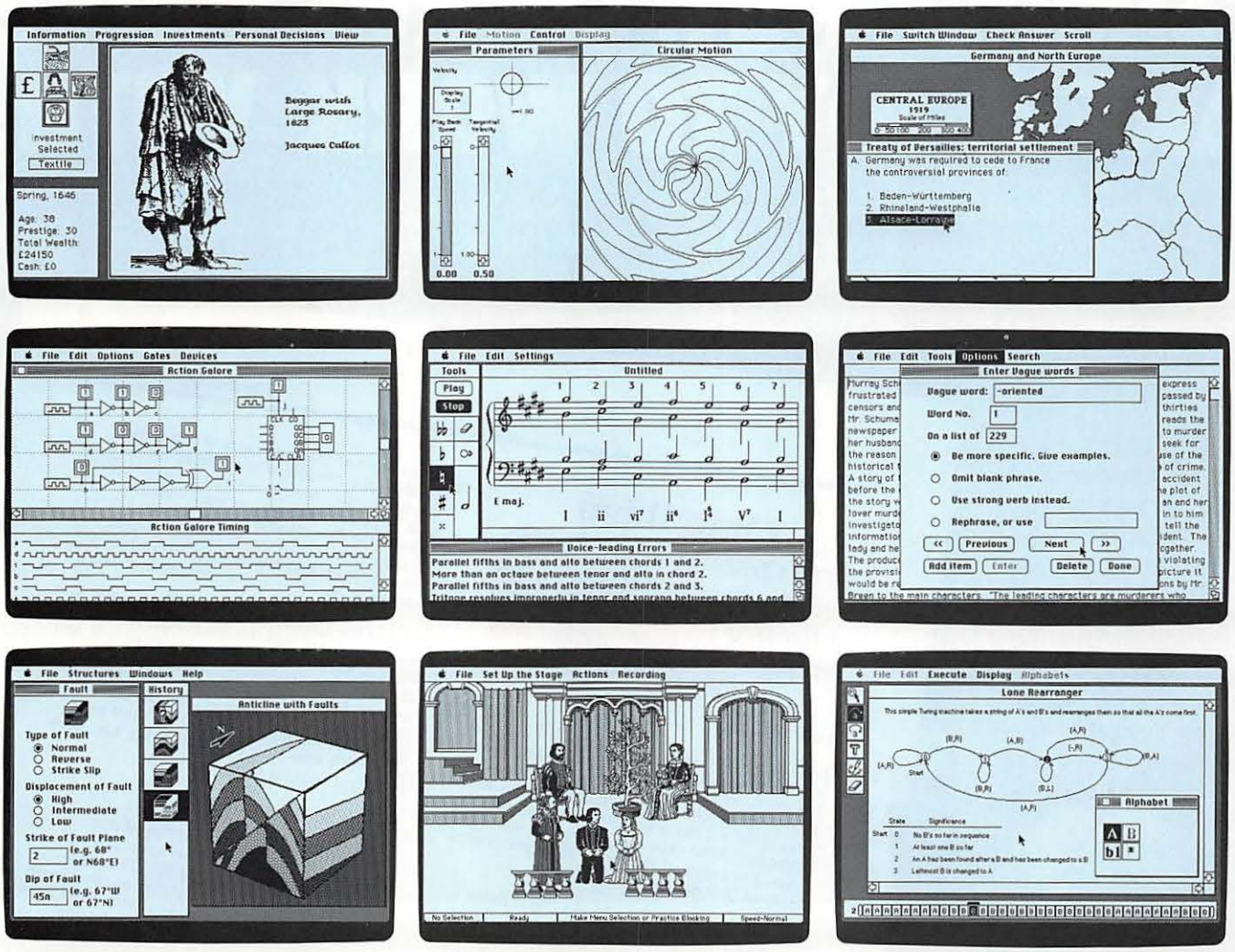


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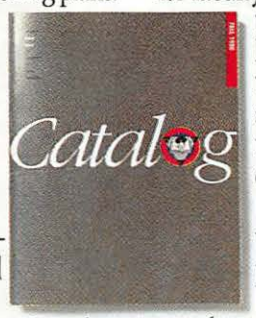


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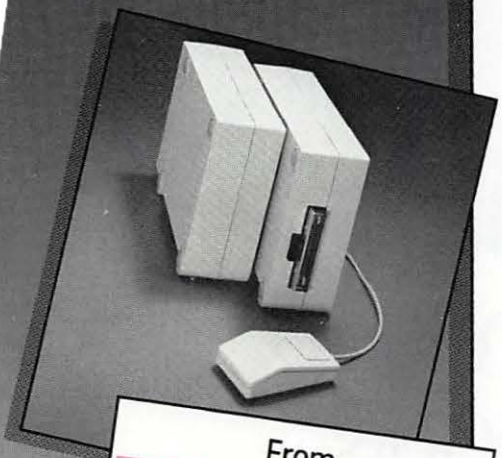
*Michael Day*
*The Macintosh Journal*



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*The Macintosh Journal*

## Cirrus Drives

**The Cirrus drives are exciting and excellent performers. They offer impressive speed, flexible software, attractive design and quiet operation.**

### Ease of Use

Running a Cirrus drive is very simple. It is just a matter of plugging the drive in and turning it on. The drives come pre-formatted and ready to go. The Cirrus has two DB 25 connecters on its case, so its cables are easier to work with than the "standard" SCSI cables that come with some drives. The design of the Cirrus drives contributes greatly to their ease of use.

The software that comes with the Cirrus drives is very flexible. It follows the Macintosh interface closely, and is well done. With the software, users can partition the drives into several volumes, or combine several drives into one single volume. Volume sizes can be changed or new ones added at any time without losing data. Password protection, manual or automatic mounting, automatic head parking, backup utilities, and disk repair utilities are all standard. In addition, the software performs several diagnostic tests including the ability to map out bad sectors and program the drive's interleave. In short, this is some of the most extensive and best written software available for Mac hard drives.

Most of the Cirrus' flexibility comes from their excellent software. However, the physical construction of the drives also contribute to their superior flexibility. Unlike other drives for the Mac, Cirrus drives can be placed vertically or stacked horizontally depending on your desktop requirements.

### Performance

Cirrus drives were engineered to perform well in everyday situations. These drives are very fast when performing common operations such as going to the chooser or building the desktop. Reading and writing to and from files is also very fast. Using the Cirrus drives gave us an appreciation of the importance of ergonomic design to performance. For instance, fan noise can increase fatigue in office workers. A drive that is built to be quiet and easy to work with may not increase the data transfer rate, but it will help to get more productivity out of the user. Cirrus drives are quiet and easy to work with which we consider to be a plus in their performance rating.

Because the Cirrus software is so good, users may want to use it to initialize drives from different manufacturers. In our tests, this worked well, and allowed drives of differing origin to be linked together as one volume. Since many of the older SCSI drives came with poor software, this is a good argument for buying a Cirrus drive and chaining it with other drives after they have been initialized with the Cirrus software.

### Design and Construction

The Cirrus drives, though very small and lightweight, (about 4 lbs.), are constructed of quality materials designed to last. Their light weight is due to the small number of components in each drive and to their plastic case. The Cirrus drive is both sturdy and durable; the internal power supply is encased in aluminum, and the drives are shock mounted on rubber bearings.

The Cirrus drives have the most exciting, simple and elegant design we have seen in a hard drive for the Macintosh. The modular construction of the drives means that any repair work will be quick and easy. Simply put, Cirrus drives are a joy to work with.

### Recommendations

Cirrus drives were designed for the the professional user. They were not engineered to be low cost products, or to be "just adequate performers;" they are built with premium components. These are powerful drives with powerful software. Cirrus drives are an excellent solution for users who demand a lot. Readers should also note that several new products are in the pipeline and that a 40MB tape backup and 30MB hard drive are currently available. We give the Cirrus 20, 40 and 60 drives an excellent rating (8 on a scale of 10) and recommend that other drive manufacturers follow the Cirrus example, and design drives that are simple, elegant and impressive performers. *-Michael Day*

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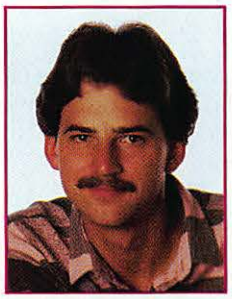


# Quick Tips

## *Answers to your questions*

***by Lon Poole***

Arrgh! I felt like a hamster forced to live in a room with one of those ultrasonic rodent-repeller devices. My Mac Plus was emitting an intolerable high-frequency squeal. I decided to endure it for a while, hoping it would eventually go away. Finally, no longer rational, I hit the side of the Mac (a questionable move, perhaps, but it always fixed the old black-and-white TV in college). That didn't help, but fortunately, it didn't hurt either.

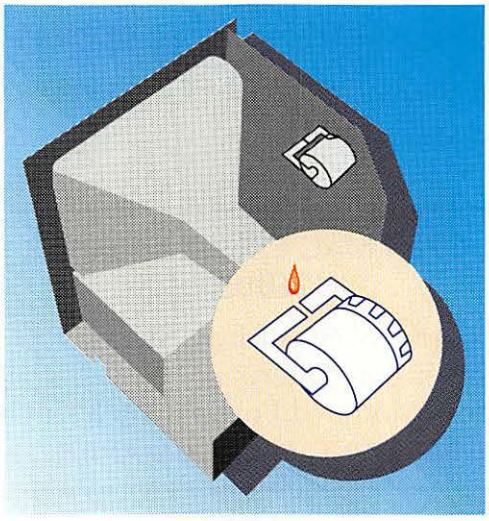
### Squealing Mac

Before I got around to getting out the baseball bat (nothing squeals after a solid whack with a Louisville Slugger), I visited John Sawyer at CJS Systems (3051 Adeline, Berkeley, CA 94703, 415/849-3730) to do some research on an article. Those guys repair Macs day after day, so I asked them about the squeal. Yes, it's a common problem, they reassured me, and yes, it could be fixed without hitting the Mac out of the ballpark.

The squealer turns out to be part of the video circuitry, specifically, the flyback transformer. It has two pieces that may vibrate against each other at a frequency of 15 kHz or so. The cure: open the Mac, remove the flyback transformer from the analog board, and disassemble the transformer. Next, strategically place a cushioning drop of oil between the offending parts. Then reassemble and reinstall the transformer. "Silence the Squealer" illustrates the procedure.

### Key Caps Snapshot: Take 2

A few November *Quick Tips* readers noticed a missing step in the instructions for taking a snapshot of the Key Caps window. While pressing the Shift or Option key (or both), place the pointer over the title bar of the Key Caps window, and hold down the mouse button. Depending on the result you want, press ⌘-Shift-3, ⌘-Shift-4, or ⌘-Shift-Caps Lock-4. Before releasing the mouse button, press the Shift/Option-key sequence you want in the snapshot (this was the missing step). When you release the mouse button, the print (or save) procedure begins.



***Silence the Squealer***

*A squealing Mac Plus can usually be silenced by disassembling the flyback transformer (located on the analog board) and placing a drop of oil in the spot shown here.*

### Pesky Test Pages

Perhaps you'd like to halt the flood of test pages pouring out of your LaserWriter but don't want to dirty your hands with PostScript commands (see *Quick Tips,* June 1987) and can't remember to pull the paper cassette out each time you turn on the printer (as suggested in *Quick Tips,* December 1987). The Widgets application (part of the *DiskTop* 2.0 package from CE Software, 801 73rd St., Des Moines, IA 50312-1051, 515/224-1995) has commands to turn the test page on and off. Either command stays in effect until you choose its counterpart.

### Q Best Draft Quality

I use *Microsoft Works* and an ImageWriter II for most of my correspondence. I usually use Courier 12, set print quality for near-letter-quality, and select Draft mode. Although the text prints clearly, the wide spaces between words spoil the appearance of my letters and make them hard to read. Is there any way to get even word spacing?

*Andrew C. Mills*
*Scotch Plains, New Jersey*

A The ImageWriter uses its own nonproportional font for draft-quality printing. To match the word spacing of the Mac's proportional fonts, the printer (actually the ImageWriter driver software) inserts unsightly gaps between the draft-quality words. You eliminate the gaps by changing the entire document to a nonproportional font–such as Courier 12 or Monaco 12–before printing it in draft quality. That much you've done.

To eliminate the draft gaps in a *Works* document, you must also choose Page Setup and deselect the Tall Adjusted option. You have to do this only once for each document. *Works* automatically selects the Tall Adjusted option for each new document. Most other word processors–including *Word, MacWrite,* and *WriteNow*–do the opposite.

### Quick Symbol

***Tip:*** In *Microsoft Word* 3.01, press ⌘-Shift-Q, and the next character you type will appear in the Symbol font. After you've typed that character, *Word* automatically

*(continues)*

reverts to the normal font. This feature is very handy for formulas and technical word processing.

*Bruce E. Wilson*
*Lynnwood, Washington*

**Font Freedom in Stacks**

***Tip:*** If you're preparing a *HyperCard* stack for wide distribution, you needn't feel limited to the four system fonts–Geneva 9, Geneva 12, Chicago 12, and Monaco 9–just because you don't know what other fonts your recipients have available. Use *ResEdit* to install your chosen font in the *HyperCard* stack. Then anyone who views that stack will see the font properly displayed.

*Bruce Long*
*Tempe, Arizona*

*Put* ResEdit *away for this one. You can install fonts in documents (*HyperCard *or any other) easily by using Font/DA Mover. Normally that application lets you open only system and font files. If you press the Option key when you click its Open button, you'll be able to open any document or application for installing fonts. Note, however, that installing fonts will increase the size of your stack–sometimes substantially.*

*In his book* The Complete HyperCard Handbook, *Danny Goodman mentions that most fonts are copyrighted. You may need permission from the copyright holder to distribute a font with your stack. However, Apple does not require licensing of any screen fonts that come with a Macintosh, LaserWriter, or LaserWriter Plus.*

*Goodman also points out that you can use any font at all when creating background or card graphics. When you use the text tool from the Tools menu, text in the selected font becomes part of the dot pattern that makes up the picture you're creating. The stack user doesn't need the fonts you used to see text you painted on the background or card.*

**A Word Spreadsheet**

***Tip:*** You can use *Microsoft Word* 3.01 to create a spreadsheetlike grid of vertical and horizontal lines. Then fill in the grid by computer, or print it and fill it in by

*(continues)*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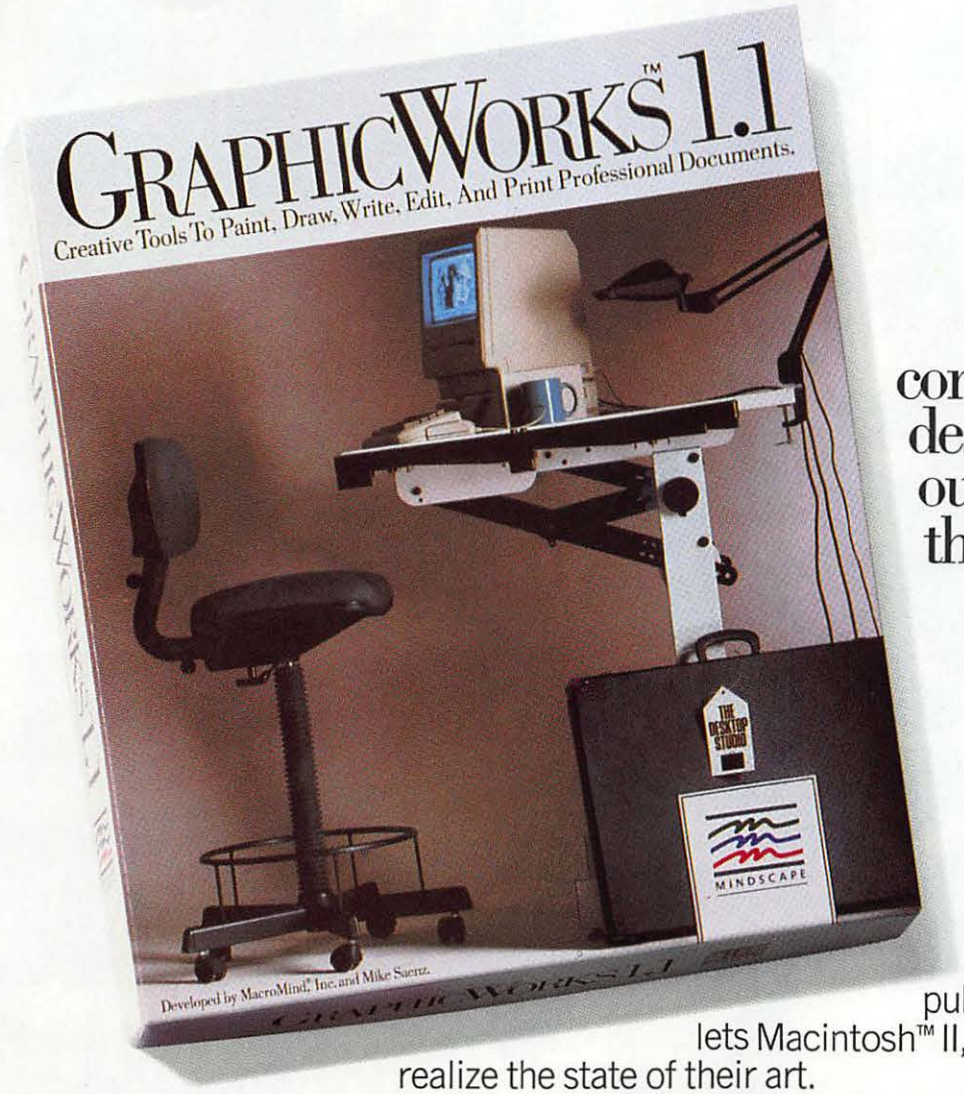


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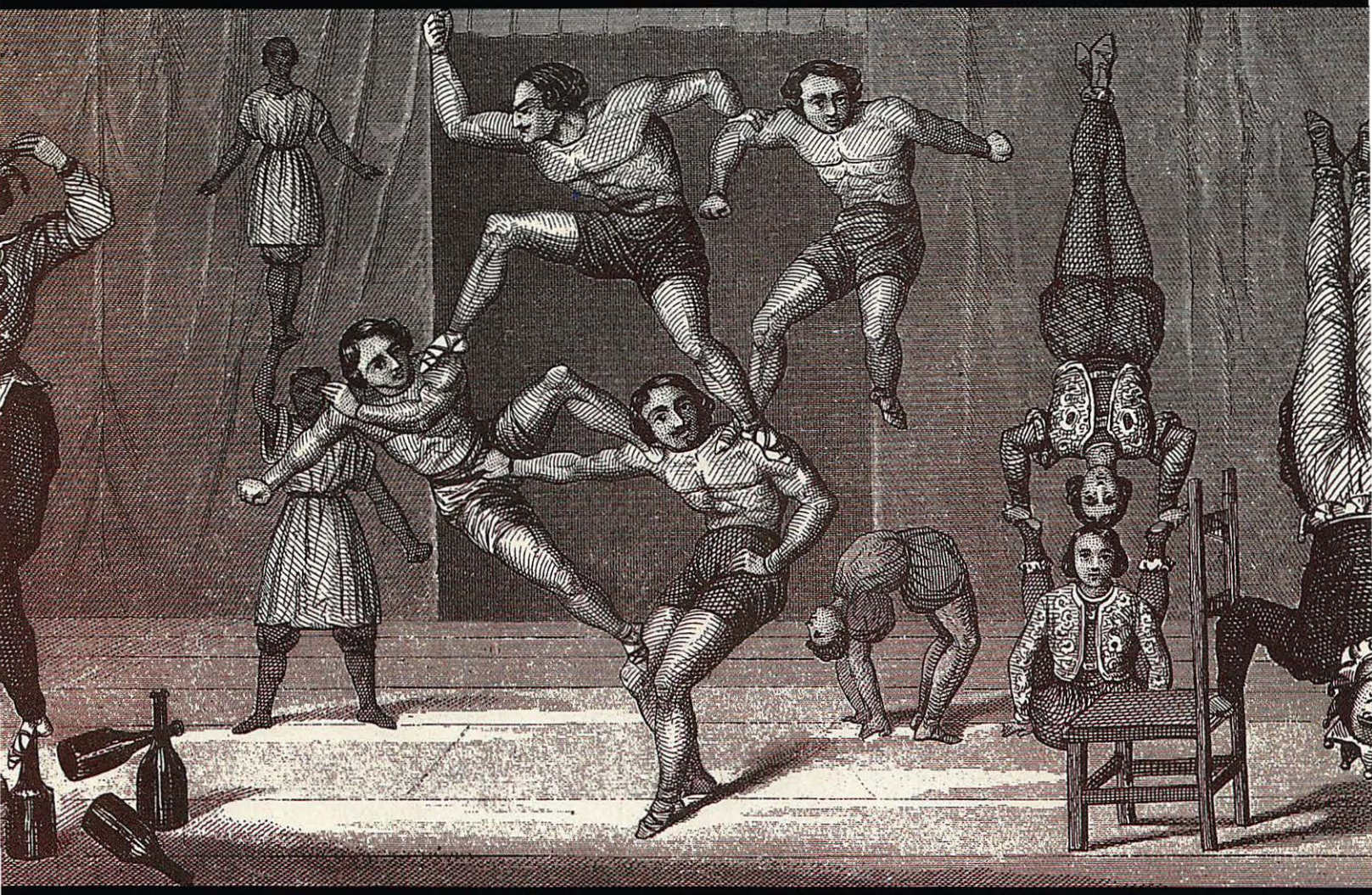

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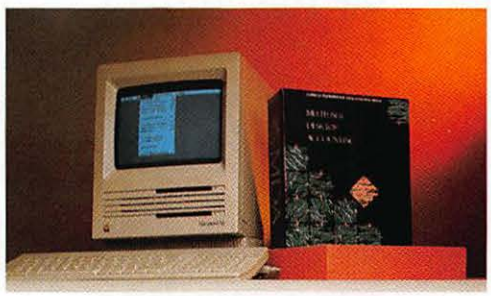

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**Circle 251 on reader service card**

hand. You can even use *Word* to perform simple arithmetic calculations on rows or columns of numbers you type in the grid "cells" (see "Grid Processing").

To create a page-size grid, use Page Setup to make the margins narrow–0.75 inch or 0.50 inch. Next, make the formatting ruler visible (choose Show Ruler from the Format menu) and click the vertical line marker that's next to the decimal tab marker in the lower half of the ruler. Click in the ruler, just below the number line, everywhere you want *Word* to draw a vertical line. To set up the horizontal lines, choose Paragraph from the Format menu and click the Below and Single Border options. Draw the grid lines by pressing Return repeatedly. Finally, select the first line of the grid and remove the vertical line markers from the formatting ruler.

Adjust the spacing of horizontal lines with the line-spacing icons in the formatting ruler. Or enter spacing specifications when you choose Paragraph from the Format menu. Adjust spacing of vertical lines by dragging the vertical line markers in the formatting ruler. Remember to select all the rows before making adjustments.

To facilitate typing within the grid, select the whole document and set tabs near each vertical bar. Use a left tab just to the right of a vertical line marker for left alignment. Use a right tab or decimal tab just to the left of a vertical line marker for right alignment.

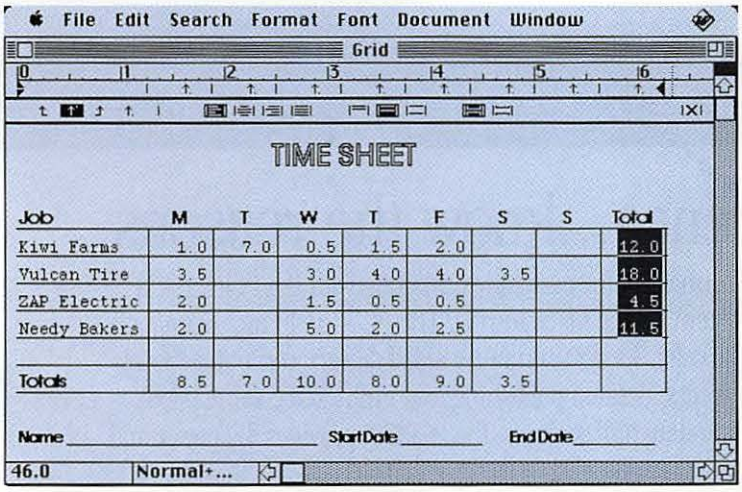
You can add a row or column of numbers by selecting the numbers and choosing Calculate from the Document menu. The total appears in the lower-left corner of the document window and is automatically copied to the Clipboard, so you can paste it into your document. To select a column, press Option, and drag. Or click at the beginning of the column, move the pointer to the end of the column, press Shift-Option, and click again.

*Joan P. Mitchell*
*Santa Barbara, California*

### Hide Pattern Palette Only

***Tip:*** Only the pattern palette disappears in *FullPaint* 1.0 if you press ⌘-Option-T. This is helpful if you constantly switch tools but rarely change patterns. The extra space is nice to have.

*Mike Pinkerton*
*Reston, Virginia*




***Grid Processing***
*Draw a grid in a* Microsoft Word *3.01 document by using the formatting ruler for vertical lines and the Paragraph command for horizontal lines. Fill in the grid by typing or by hand. Option-drag a column of typed numbers and use the Calculate command to add them.*

### Security Blanket

***Tip:*** I discovered an alternative to the expensive metal security clip that snaps into the Mac's security slot. A closed loop approximately one inch in diameter of 3/16-inch vinyl-coated steel cable (5/16-inch outer diameter) will slip neatly into the slot. A loop at one end of the cable captures the keyboard, a loop in the middle restrains the Mac, and a loop at the other end lets you padlock the cable to the table. When the loops have been formed by heavily crimping dual ferrules into place, the Mac, keyboard, and cable become in-

*(continues)*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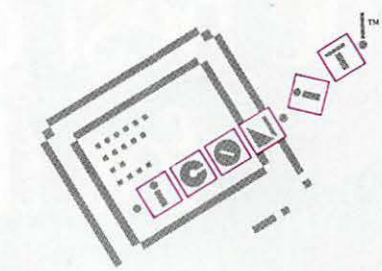


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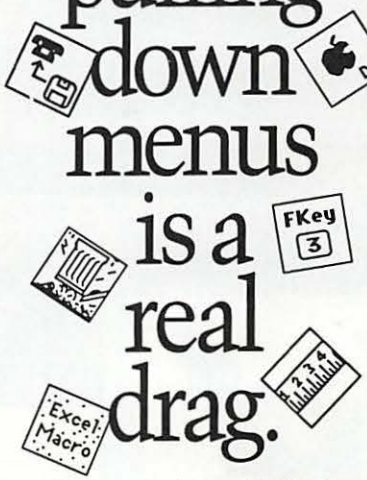


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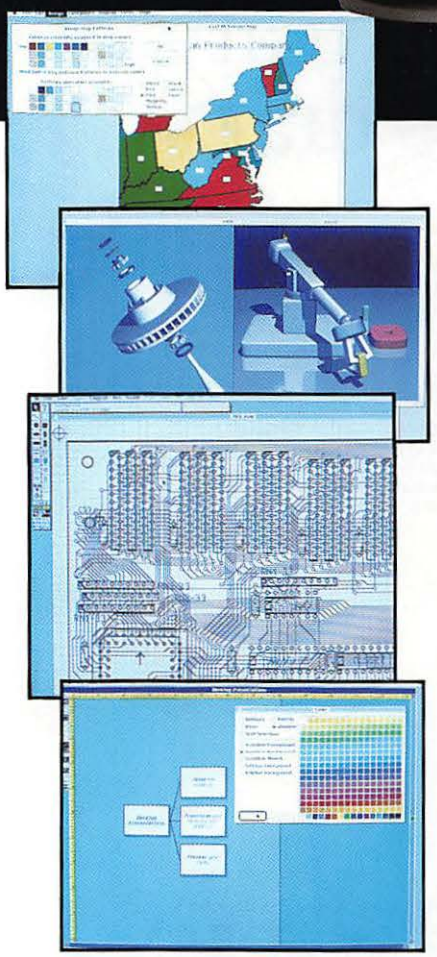
**Circle 121 on reader service card**

# The best color graphics system for the Macintosh II.



## See the difference...know the reasons

You are about to enter a new dimension in personal computing with the PCPC II™, a high resolution color graphics system for the Macintosh II. The PCPC II 19 inch monitor gives you a giant window into the color world of computer aided design, computer modeling, advertising, presentation graphics, desktop publishing and unlimited color applications. Designed for the most demanding professionals, the PCPC II provides the power and performance required to be your creative best.

Look at a PCPC II and experience the sharpest and most vivid colors possible. Witness a dazzling display of 256 colors from a palette of 16.8 million hues for the most realistic images possible. And for monochrome graphics, 256 shades of gray provide maximum detailing.

At PCPC, quality is an essential part of the design. Quality starts with state-of-the-art monolithic CMOS technology, Zip-pack video RAM for high reliability, and the lowest possible parts count to assure long life and trouble-free use. With 768K of video RAM, the PCPC II provides a resolution of 1024 x 768 with 8 bits per pixel. The non-interlaced display ensures an absolutely flicker-free screen and the sharpest picture imaginable. The high resolution monitor (previously found only on engineering workstations costing many thousands of dollars more) displays your work in its best light. The monitor's super fine pitch (0.31 mm) means you get incredible clarity. And for your personal comfort, the PCPC II features an anti-glare coating and a tilt-swivel base.

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separable (see "Unliberated Mac"). If you can't find any crimp-down 3/16-inch ferrules in stock, ask your local hardware store to order Part No. 8050 or 805 from Door Products, P.O. Box 584, Bensenville, IL 60106, 312/595-3626.

Although crimping tools are quite expensive, don't be deterred if you don't already own one. All the other materials should cost no more than $10 at the hardware store, which will probably let you use its crimping tool on the premises without charge. The savings are remarkable if you must secure several Macs.

Oh yes, those nifty lightweight accessories–power cord, mouse, external disk drive–are easily handcuffed by laying their cords through the padlock just before closing it. If you need to secure components with removable cords, use a longer security cable with an extra crimped loop for each additional device.

FRED STIMSON

***Unliberated Mac***

*Make an inexpensive security system for your Mac from steel cable, ferrules, and a padlock.*

*Bruce Bush*
*High Springs, Florida*

**Quit to Finder, not HyperCard**

***Tip:*** When quitting an application opened from *HyperCard,* you can return to the Finder instead of to *HyperCard.* After choosing Quit from the application's File menu, hold down the Option key until the Finder menu bar appears.

*Bill Jastram*
*Tualatin, Oregon*

*(continues)*

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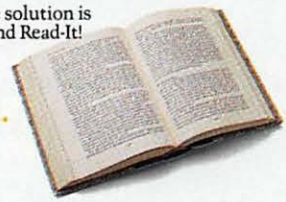

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**Circle 91 on reader service card**

# A TIFF DECISION?

192 x 199 pixel MacPaint™ image printed at 72 DPI.

## MacPaint

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## TIFF

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**Circle 734 on reader service card**

*You can read about opening other applications from* HyperCard *in the Reference section of* HyperCard*'s Help stack.*

### PageMaker Encapsulates PostScript

***Tip:*** You can create an encapsulated PostScript image entirely within *PageMaker* 2.0. First you type the PostScript program using the *PageMaker* text tool. Put the following five lines at the beginning of the program so that *PageMaker* will recognize it as encapsulated PostScript:

**%!PS-Adobe-2.0 EPSF-1.2**
**%%Creator: Hans Castorp**
**%%Title: Logo**
**%%CreationDate: 5/27/87**
**%%BoundingBox:** ***llboriz llvert urboriz urvert***

In the last PostScript line above, you replace the italicized terms with numbers that specify the coordinates of the rectangular area that bounds the PostScript image, called the *bounding box.* The terms *llboriz* and *llvert* specify the horizontal and vertical distances in points from the lower-left corner of the page to the lower-left corner of the bounding box. *Urboriz* and *urvert* specify distances to the upper-right corner of the bounding box.

Strictly speaking, only the first and last PostScript lines are required. But since all encapsulated PostScript graphics look pretty much alike until printed, the other three lines are useful for identification purposes. *PageMaker* displays all five lines in the gray box it uses to represent the encapsulated PostScript graphic on screen.

After typing the program, save it using *PageMaker*'s Export command with the Text Only option. Then place the encapsulated PostScript graphic in your *PageMaker* document using the Place command.

*Mike Peters*
*Stanford, California*

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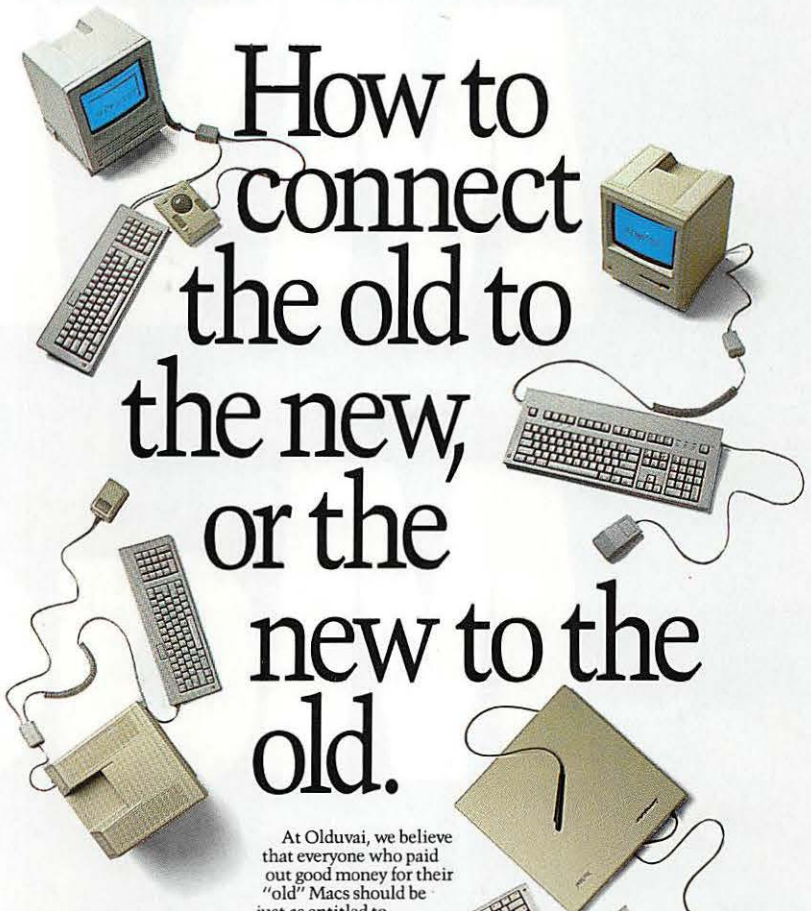

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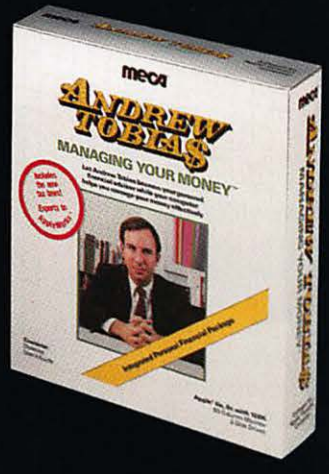


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# Getting Started with Desktop Publishing

*A publishing primer, outfitting an electronic layout table, and some basic tenets of typography*

***by Jim Heid***

In the last thirty years, the graphic arts industry has seen more revolutions than any third-world country. In the sixties, the turn-of-the-century Linotype and Monotype hot-metal typesetters based on medieval printing technologies rapidly began to be displaced by phototypesetting machines whose speed and output improved in quantum leaps–each machine becoming obsolete within a few years of its introduction. The seventies saw large publishing houses, printers, and newspapers begin to use on-screen page-makeup systems that allowed graphic artists to lay out pages electronically–without T squares, X-acto knives, and the other tools of mechanical pasteup.

Although electronics played a prominent role in the evolution of phototypesetting and electronic page-makeup equipment, microcomputers didn't. They lacked the processing power to calculate precise character widths and line endings, and the graphics to display various fonts and sizes. But then the Macintosh appeared, ready to challenge the competition. Armed with *desktop publishing programs,* the Mac has picked off the expensive page-layout systems, sniped at typesetters, and forced established type houses either to join the revolution or to retreat.

As a computer user, I'm excited to see that technology has advanced enough to enable nonprofessionals to set type and paste up pages with a $2000 Macintosh. But as a former typographer, I'm offended when I see that technology misused. Properly producing a printed piece takes time, patience, and at least a rudimentary knowledge of design and typographic concepts.

MAX SEABAUGH

This month, we examine desktop publishing–and the responsibilities you assume when you start producing your own publications.

### The Desktop Difference

In the world of electronic page makeup, a video screen and a mouse (or some other pointing device) replace the traditional layout table and its tools (see "Layout and Pasteup the Old-Fashioned Way"). Rules, windows, and crop marks are added with electronic drawing tools; then the whole shebang is sent to a phototypesetting machine that delivers a camera-ready page. The basic steps are the same, except that they're accomplished within the friendly confines of a Macintosh.

If you're willing to invest some time and effort in learning a sophisticated word processor or a desktop publishing program and some fundamentals of publishing design, you can do what used to require several specialists and quite expensive typesetting equipment. Using the Mac, you can

*(continues)*

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Scoop's rich set of page-layout features are unparalleled. Ideal for producing both long and short publications, Scoop supports kerning, letterspacing, and sophisticated leading options. It allows you to automatically wrap text around irregularly shaped graphics, link text blocks and pour over multiple pages, or include automatic pagination with time and date stamping.

Scoop not only has built-in Draw and Paint features, it has a powerful word processor with fast automatic hyphenation and batch or interactive spell checking. It can also import formatted Word files, Text Only files, and art (including EPSF) from almost any graphics program. You can even create spot-color overlays; designate special effects such as slanted margins or rotated, stretched, and compressed type; and specify gray shades or patterns for text.

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A Universal Macro option allows you to record sequences in one application that will play in other applications. And Smart Menu selections remember commands by name, not position, so your macro plays back properly even if menus are moved or changed.

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**Order from this ad through March 1, 1988. All prices, specifications, and availability subject to change without notice.**

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| | | | |
|---|---|---|---|
| 1765 | • AppleTalk Adapter | | $ 8 |
| 2006 | Pocket Modem | SPECIAL | $ 169 |
| 2247 | Red Ryder | NEW | $ 59 |

## HARDWARE

| | | | |
|---|---|---|---|
| 1142 | A+ Mouse | | $ 79 |
| 2219 | • A+ Mouse ADB | | $ 99 |
| 1902 | AST TurboScan Flatbed | | $1599 |
| 2003 | Datacopy Scanner 730 | | $ Call |
| | *Flatbed scanner; includes software* | | |
| 2093 | • Document Feeder | | $ Call |
| 2004 | • Software & Interface | | $ Call |
| | Dove Computer Corp. | | |
| | *We carry MacSnap Upgrades; call to order* | | |
| | Kurta Graphics Tablets | ON SALE | |
| 1900 | • IS/One (12 x 12) | | $ 499 |
| 1898 | • IS Penmouse (6 x 9) | | $ 199 |
| 1946 | • IBM XT Interface Kit | | $ 39 |
| | *Call to order extra input devices* | | |
| 1452 | MacBuffer/256K | | $ 249 |
| 1451 | • MacBuffer/512K | | $ 329 |
| 1450 | • MacBuffer/1024K | | $ 429 |
| 1966 | Mac 101 Keybd/Bge | SPECIAL | $ 159 |
| 2059 | • Mac 101 ADB for SE or II | | $ 159 |
| 1207 | MacVision | | $ 175 |
| | MinuteMan Power Supplies | | |
| 1866 | • MinuteMan 250 | | $ 289 |
| 1867 | • MinuteMan 300SS | | $ 439 |
| 2118 | • MinuteMan 600SS | | $ 739 |
| 1806 | Neos Mouse | | $ 49 |

The **Seikosha Printer** is a dot-matrix printer that works just like the ImageWriter I. Get the same quality and convenience for less than half the price.

*Works w/any Mac*

**1871 • From Seikosha America**

**$229**

| | | | |
|---|---|---|---|
| 1718 | PC MacKey | | $ 119 |
| 1724 | quadLYNX Trackball | | $ 99 |
| 1835 | QuickStick | | $ 49 |
| 1997 | ScripTEN 3MB PostScript Printer | | $4295 |
| | *We carry all ScripTEN accessories & supplies* | | |
| 1871 | Seikosha Printer | | $ 229 |
| 1141 | • Printer Stand | | $ 17 |
| 1935 | • Ribbon for Seikosha | | $ 8 |
| 1054 | ThunderScan 4.0 | SPECIAL | $ 199 |
| 1570 | • TScan to Plus/SE Adapter | | $ 49 |
| | *Needed for earlier versions only* | | |
| 2166 | UltraScan Monitor | | $ 599 |
| 2167 | • UltraScan Cable | | $ 49 |

## DISK DRIVES

| | | | |
|---|---|---|---|
| 1906 | Bering 20+20 Cart Drive | | $2295 |
| | *We carry accessories for your Bering Drives* | | |
| | CMS SCSI Drives | | |
| 1971 | • Compact SC20 | | $ 599 |
| 1970 | • Compact SC40 | | $ Call |
| 1969 | • MacStack SD20 | | $ Call |
| 1968 | • MacStack SD43 | | $ Call |
| 1967 | • Pro 40 SE Internal Drive | | $ Call |
| 2124 | • Pro 40 II Internal Drive | | $ Call |
| 2085 | • S-140 | | $ Call |

See the vivid difference of the 14-inch **UltraScan Monitor**. Non-glare screen, 640 x 480 resolution, more than 256 colors, and a convenient tilt base.

*Requires Mac II Adapter Cable & Mac II w/ Apple Video Card (or equivalent)*

**2166 • UltraScan Monitor** **$599**

**2167 • Adapter Cable** **$49**

| | | | |
|---|---|---|---|
| 2086 | • S-240 | | $ Call |
| 2087 | • S-320 | | $ Call |
| 1972 | • SE Internal Cabinet Kit | | $ 149 |
| 1607 | Ehman 800K Drive | | $ 189 |
| | MacBottom Drives | | |
| 1323 | • HD 20 Serial/Beige | SPECIAL | $ 859 |
| 1653 | • HD 21 SCSI/Beige | SPECIAL | $ 799 |
| 1843 | • HD 21M/Beige | SPECIAL | $ 949 |
| 1842 | • HD 45 SCSI/Beige | SPECIAL | $1199 |
| 1845 | • HD 45M/Beige | SPECIAL | $1349 |
| | *All drives available in platinum; call to order* | | |
| 1846 | • Modem Upgrade | | $ 189 |
| | *Add 1200 bps modem to any MacBottom* | | |
| | NuData SCSI Drives | | |
| 2154 | • Data Cell 40/40T | NEW | $1999 |
| 2155 | • Data Cell 90 | NEW | $1899 |
| 2156 | • Data File 40T | NEW | $ 999 |

## ACCESSORIES

| | | | |
|---|---|---|---|
| 2079 | AnthroCart | | $ 249 |
| | *Call to order accessories* | | |
| | Backup Cassettes | | $18-28 |
| | *We carry cartridges to fit most tape backups* | | |
| | Cables | | $15-40 |
| | *We have a full line of quality cables; call to order* | | |
| | Carrying Cases | | |
| 1631 | • For ImageWriter I & II | | $ 69 |
| 1644 | • For Mac & Mac Plus | | $ 89 |
| | Copy Holders | | |
| 1882 | • Desktop (8 1/2 x 11) | | $ 12 |
| 1883 | • Desktop/Wide (11 x 17) | | $ 19 |
| 1884 | • SpaceSaver (8 1/2 x 11) | | $ 28 |

The optical **A+ Mouse** moves effortlessly across its special pad (included). Quiet & comfortable, it has no moving parts that wear out or need cleaning.

From Mouse Systems Corp.

**1142 • A+ Mouse** **$79**
*Works w/128K, 512K & Mac Plus*

**2219 • A+ Mouse ADB** **$99**
*Works w/Mac SE & II*

| | | | |
|---|---|---|---|
| 1769 | Data Switch/128 & 512K Mac | | $29 |
| 1820 | Data Switch/Plus, SE & II | | $39 |
| | Disk Holders | | |
| 1387 | • disk•book-10 | | $12 |
| 1399 | • disk•book-32 | | $22 |
| 1572 | • disk•book-Plus (16) | | $20 |
| 1032 | • Fellowes Disk Holder | | $16 |
| 1033 | • Fellowes w/Lock | | $18 |
| 1597 | • Mahogany Disk Holder | | $28 |
| 1815 | • Rolltop Cabinet/45 | | $15 |
| 1816 | • Rolltop Cabinet/90 | | $24 |
| 1781 | • Traveller-4 | | $ 5 |
| 1780 | • Traveller-8 | | $ 7 |
| 1779 | • Traveller-12 | | $ 9 |
| | Dust Covers | | |
| 1406 | • External Drive Cover | | $ 7 |
| 1407 | • IW (standard) Cover | | $11 |
| 1408 | • IW (wide) Cover | | $13 |
| 1410 | • IW II Cover | | $11 |
| 1411 | • LaserWriter Cover | | $17 |
| 1404 | • Mac & Keyboard Cover | | $15 |
| 1409 | • Mac Plus & Keyboard Cover | | $15 |

Protect your expensive equipment from damaging dust and static with these attractive **Dust Covers**. Finely tailored and made of waterproof rip-stop nylon for extra protection.

*See Product Listing for prices*

From Sensible Softworks

| | | | |
|---|---|---|---|
| 2222 | • SE & Std. Keyboard Cover | | $15 |
| 2221 | • SE & Extended Keyb'rd Cover | | $15 |
| 1296 | Fanny Mac/Beige | | $59 |
| 2183 | Fastpad Mouse Pad | NEW | $12 |
| 1402 | Head & Screen Cleaner | SPECIAL | $15 |
| | ImageWriter Ribbons | | |
| 1876 | • Black | EACH | $ 4 |
| 2224 | • Black 6-pack | | $20 |
| 1643B | • 4-Color (IW II) | EACH | $12 |
| | *Single ribbons also available in blue, green, red, or yellow; call to order* | | |
| | Kensington | | |
| | *We carry all Kensington products; call to order* | | |
| | Laser Cartridges | | |
| | *We carry new and reconditioned cartridges* | | |
| 1283 | MacCracker | | $20 |
| 2182 | Mac DayDreams | | $10 |
| | *Four-color, 12" x 24" 12-month wall calendar* | | |
| 1527 | MacInker (IW I & II dedicated) | | $42 |
| | *Call to order ink and rollers* | | |
| 1650 | Mac 'N' Frost/Beige | | $59 |
| 2114 | Mac 'N' Frost/Platinum | | $64 |
| 1029 | MacTilt | SPECIAL | $74 |
| 2071 | • MacTilt/Platinum | SPECIAL | $74 |
| 1832 | • MacTilt for Large Screen | | $89 |
| 1943 | • MacTilt for Mac SE | SPECIAL | $74 |
| 1977 | Mouse Cleaner 360° | | $15 |
| 1143 | Mouspad (7 x 9) | | $ 8 |
| 1525 | Mouspad (9 x 11) | | $ 9 |
| 2223 | Power Director P25 | | $66 |
| 1813 | PowerLine One | | $ 9 |
| 1498 | PowerLine Strip | | $39 |
| 1657 | SCSI Terminator | | $49 |
| 2097 | System Sweeper | | $37 |

Finally — a Mac word processor that is as powerful as it is easy to use. **WordPerfect** boasts all the standard features, plus macros, kerning, mail merge, footnotes, a 115,000-word spell checker, a comprehensive thesaurus, and hyphenation.

*Works w/ 512E, Mac Plus, SE & II*

**2252** • From WordPerfect Corp.

**$249**

## DISKETTES

| | | | |
|---|---|---|---|
| 2226 | Fuji Color DS/DD-10 | NEW | $24 |
| 1144 | Sony Diskettes SS/DD-10 | | $14 |
| 1344 | Sony Diskettes DS/DD-10 | | $19 |
| 2072 | Sony Diskettes SS/DD-50 | | $59 |
| 2073 | Sony Diskettes DS/DD-50 | | $79 |

Wait! This isn't really the end. We carry many more products than we're able to list, and new ones are coming in all the time. If you don't see something you're looking for, call to ask.

Order from this ad through March 1, 1988. Prices and availability are subject to change without notice.

**NOTE:** These prices do not include shipping/handling charges; please call for rates.

**AffiniFile** stores & retrieves your important information quickly — with an automatic index. This DA manages all your notes & graphics easily!

*Works w/512E, Mac Plus, SE & II*

**2186** • Affinity Microsystems, Ltd.

**$59**

**800/228-8910**

*Good anywhere in U.S.*

| STOCK # | PRODUCT NAME | | PRICE |
|---|---|---|---|

## SOFTWARE

| | | | |
|---|---|---|---|
| | Adobe Fonts<br>*We carry all Adobe Fonts; call to order* | | |
| 2186 | AffiniFile | | $ 59 |
| 1840 | Business $ense | | $ 309 |
| 1817 | CalendarMaker | | $ 35 |
| 2106 | Canvas | | $ 119 |
| 2107 | • Canvas DA only | | $ 64 |
| 1911 | C.A.T. | | $Call |
| 1889 | Certificate Maker | | $ 42 |
| 2168 | CheckMark Payroll | | $ 199 |
| 2103 | Coach 3.0 | | $ 62 |
| 2104 | • Coach Professional | | $ 119 |
| 2179 | • Coach Prof. Network | | $ 299 |
| 1523 | Colormate | | $ 48 |
| 1503 | Colormate Art | | $ 29 |
| 1444 | ColorPrint | | $ 25 |
| 2145 | Comic Strip Factory | | $ 55 |
| 2227 | • Comic People | NEW | $ 24 |
| 2105 | Comment | | $ 64 |
| 1485 | Concertware Midi | | $ 99 |

Stay out of the Finder with **DiskTop,** a time-saving DA that lets you find, delete, rename, copy, move, launch — without quitting an application!

*Works w/512E, Mac Plus, SE & II; hard disk recommended*

**2230** • From CE Software

**$39**

| | | | |
|---|---|---|---|
| 1097 | Concertware Plus | | $ 49 |
| 1012 | Copy II Mac | | $ 25 |
| 1696 | Cricket Draw | | $ 175 |
| 1335 | Cricket Graph | | $ 125 |
| 2228 | Cricket Presents | NEW | $ 399 |
| 2174 | DA-Switcher | NEW | $ 29 |
| 2229 | dBase Mac | NEW | $Call |
| 1211 | Deluxe Music Constr'tn. Set | | $ 74 |
| 1868 | Dinner at 8 Bundle | SPECIAL | $ 49 |
| 1856 | Disk Express | | $ 30 |
| 1912 | DiskFit | | $ 65 |
| 2048 | • Network DiskFit | | $ 279 |
| 2230 | DiskTop 3.0 | NEW | $ 39 |
| 2211 | Double Helix II | NEW | $ 489 |
| 1013 | Electric Checkbook | SPECIAL | $ 27 |
| 2200 | Eureka | NEW | $ 129 |
| 2141 | Expressionist | NEW | $ 59 |
| 1737 | FactFinder | SPECIAL | $ 39 |
| 2217 | FastBack for Mac | NEW | $ 62 |
| 1664 | FileMaker Plus | | $ 189 |
| 2049 | Findswell | | $ 37 |
| 1018 | Fluent Fonts | | $ 29 |
| | Fluent Laser Fonts | EACH | $ 48 |
| 1403 | FullPaint | SPECIAL | $ 49 |
| 1705 | Glue | SPECIAL | $ 39 |
| 2171 | GridMaker | NEW | $ 34 |
| 1289 | Hard Disk Utility | | $ 57 |
| 2233 | HB Music Engraver | NEW | $ 325 |
| 1678 | HFS Backup from PCPC | | $ 29 |
| 1987 | Illustrator | | $Call |
| 2209 | ImageStudio | NEW | $ 329 |
| 1095 | In-House Accountant | SPECIAL | $ 99 |
| | Japanese Clip Art | EACH | $ 65 |
| 2152 | LaserFX | NEW | $ 139 |
| 1707 | LaserServe (per user) | | $ 64 |
| 1581 | LightspeedC | | $ 125 |
| 1708 | Lightspeed Pascal | | $ 85 |
| 2115 | Lookup | | $ 39 |
| 2074 | MacAtlas Professional | | $ 129 |
| 1995 | MacCalc | | $ 85 |
| 1082 | MacDraft 1.2 | | $ 159 |
| 1918 | MacGraphics | | $ 149 |
| 1482 | MacInTax Federal | NEW | $ 89 |
| 1489 | • MacInTax California | NEW | $ 49 |
| 2212 | • TaxView Planner | NEW | $ 59 |
| 2047 | MacInUse 2.0 | | $ 55 |
| 1023 | MacLabeler | | $ 29 |
| 1803 | MacMoney 3.0 | NEW | $Call |
| 1710 | MacProof 3.0 | NEW | $ 124 |
| 1695 | Mac3D | SPECIAL | $ 119 |
| 1105 | Mac Zap | | $ 49 |
| 1986 | MapMaker | | $ 179 |
| 2196 | McMax | | $ 219 |
| 2149 | MergeWrite | | $ 32 |
| 1397 | Micro Planner Plus | | $ 299 |
| | Microsoft<br>*We carry all Microsoft, including new MS Write* | | |
| 1200 | MindWrite | SPECIAL | $ 159 |
| 1641 | MORE | | $ 184 |
| | Notes... | EACH | $ 42 |
| | *For Excel, PMaker 2.0, RSG 4, Works & Word 3.0* | | |
| 2153 | Omni Backup | | $ 69 |
| 2051 | 101 Macros for Excel | | $ 55 |
| 1036 | OverVUE 2.0 | | $ 149 |
| 2241 | Pict-O-Graph | NEW | $ 139 |
| 2242 | Pixel Paint | NEW | $ 329 |
| 2068 | PowerPoint | | $ 279 |
| 2243 | Power Station | | $ 36 |
| 2260 | Practica Musica | NEW | $ 89 |
| 1215 | Print Shop | | $ 37 |
| 1254 | Professional Bibliographics | | $ 199 |
| 1658 | Pro3D | | $ 199 |
| 2213 | QuickDEX | NEW | $Call |
| 2246 | Quick Keys | NEW | $ 82 |
| 1728 | Ragtime II | | $ 239 |
| 1798 | RAM Snap | SPECIAL | $ 20 |
| 2173 | Read-It! | | $ 165 |
| 2172 | • Read-It ThunderScan | | $ 85 |
| 1763 | ReadySetGo!4 | NEW | $ 329 |
| 2150 | Record Holder Plus | NEW | $ 45 |
| 2084 | Reflex Plus | | $ 189 |
| 2083 | ResuméWriter | | $ 28 |
| 2215 | Scoop | NEW | $ 329 |
| 2069 | Sentinel | | $ 195 |
| 1863 | SideKick 2.0 | | $ 62 |
| 1488 | Silicon Press | | $ 48 |
| 1465 | Smart Alarms | SPECIAL | $ 37 |
| 2144 | • MultiUser Appt. Diary | | $ 89 |
| 1857 | SmartScrap & Clipper | | $ 39 |

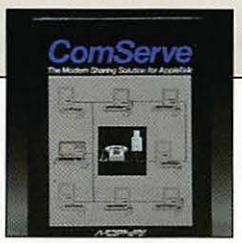
Compose and edit music easily with **Studio Session.** Use six instruments at once, then play back in realistic digitized sound. Includes sound library.

*Works w/512K & Plus (external drive recommended), SE & II; not MIDI compatible*

**1474** • From Bogas Productions

**$49**

| | | | |
|---|---|---|---|
| 2248 | Space Edit | NEW | $Call |
| 2249 | Spelling Champion | NEW | $ 35 |
| 1365 | Spellswell | SPECIAL | $ 49 |
| | *Call to order Legal and/or Medical dictionaries* | | |
| 1848 | Stella for Business | | $ 259 |
| 1937 | Stepping Out | SPECIAL | $ 57 |
| 1474 | Studio Session | | $ 49 |
| 2218 | Suitcase | NEW | $ 36 |
| 2151 | SuperGlue | NEW | $ 69 |
| 1811 | Super LaserSpool | | $ 99 |
| 1938 | • Super LaserSpool/Multi | | $ 259 |
| 1720 | SuperPaint | | $ 89 |
| 1810 | SuperSpool | | $ 49 |
| 2210 | Super 3D | NEW | $ 219 |
| 2257 | Super 3D Enhanced | NEW | $ 369 |
| | *Color version for Mac II* | | |
| 2119 | Tempo II | NEW | $ 109 |
| 1307 | • Tempo 1.2 | SPECIAL | $ 53 |
| 1804 | Thunder 1.1 | | $ 34 |
| 1432 | TopDesk | | $ 35 |
| 1847 | Trapeze | | $Call |
| 1721 | Turbo Pascal | | $ 62 |
| 2181 | VideoWorks II | | $ 125 |
| 2216 | V.I.P. | NEW | $ 99 |




Share modems and other serial devices on AppleTalk with ComServe, an easy-to-use software solution that makes the most of your resources.

*Works w/512K, 512E, Plus, SE & II*

**2123** • From InfoSphere

**$129**

| | | | |
|---|---|---|---|
| 2091 | VLS Bulk Mailer | | $ 159 |
| 2251 | WetPaint | NEW | $ 47 |
| 1377 | WillMaker | | $ 30 |
| 2132 | Word Finder | NEW | $ 37 |
| 2252 | Word Perfect for Mac | NEW | $ 249 |
| 1480 | WordTools | | $ 49 |
| 1839 | WorksPlus Spell | SPECIAL | $ 48 |

## EDUCATION/GAMES

| | | | |
|---|---|---|---|
| | Books | | |
| 2117 | • *Graphics Guide for DTP* | | $ 14 |
| 2214 | • *HyperCard Handbook* | NEW | $ 24 |
| | • *Inside Macintosh/Vols 1-IV* | NEW | $19-23 |
| 1893 | • *Macintosh Bible* | | $ 16 |
| 2175 | • *MS Word for the Mac* | NEW | $ 16 |
| 2176 | • *Run Your Business w/Excel* | NEW | $ 16 |
| 2146 | Bureaucracy | NEW | $ 25 |
| 2052 | Business Simulator | SPECIAL | $ 49 |
| 1761 | Dark Castle | | $ 32 |
| 2231 | Falcon | NEW | $Call |
| | First Byte Games | | $ 36 |
| | *We carry all First Byte programs; call to order* | | |
| 1559 | Flight Simulator | | $ 32 |
| 1475 | KidsTime | | $ 29 |
| | MacKids Games | | $ 24 |
| | *We carry all MacKids programs; call to order* | | |
| 1776 | Mac Pro Football | NEW | $ 32 |
| 1233 | Math Blaster | | $ 32 |
| 2137 | OnLine Companion | | $ 34 |
| 2208 | Rainy Day Games | NEW | $ 27 |
| 2142 | Shadowgate | NEW | $ 34 |

At last, professional-quality music-notation software for the Mac! **HB Music Engraver** is MIDI compatible, includes 124 PostScript symbols, and merges with word processor.

*Requires 512E w/1 meg of RAM, SE or II*

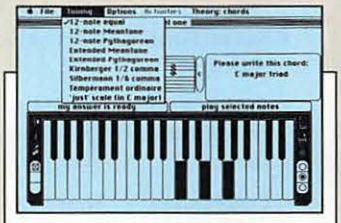
**2233** • From HB Imaging, Inc.

**$325**

| | | | |
|---|---|---|---|
| 2138 | Smart Eyes | NEW | $ 49 |
| 2139 | Smart Words/Business | NEW | $ 49 |
| 2140 | Smart Words/College | NEW | $ 49 |
| 1869 | Smash Hit Racquetball | | $ 18 |
| 2147 | Sub Battle Simulator | NEW | $ 24 |
| 1047 | Typing Made Easy | | $ 32 |

## COMMUNICATIONS

| | | | |
|---|---|---|---|
| 2157 | Avatex 1200 Modem | | $ 129 |
| 2158 | Avatex 2400 Modem | | $ 259 |
| 2159 | Capetronic 1200 bps<br>*Wall-mount modem* | | $ 119 |
| 1460 | CompuServe Subscription Kit | | $ 23 |
| 2123 | ComServe | NEW | $ 129 |
| 2088 | Dayna File | NEW | $Call |
| 1801 | Direct 1200 Modem | SPECIAL | $ 119 |
| 2053 | EMAC 2400 Modem | | $ 279 |
| 1738 | Enhanced MacCharlie | | $Call |
| | Hayes – *We carry all Hayes products* | | $Call |
| 1437 | InBox Starter Kit | | $ 239 |
| 1593 | • InBox Personal Connection | | $ 85 |
| 1973 | inTalk | | $Call |
| 1132 | MacEnhancer | | $ 175 |
| 1731 | MacLink Plus w/8' Cable | | $ 159 |
| 1396 | MacServe (per server) | SPECIAL | $ 159 |
| 2046 | MicroPhone 1.1 | | $ 119 |
| 2063 | Modular Cable Kit<br>*500' phone cable, 100 connectors & crimping tool for do-it-yourself network connections* | | $ 99 |
| 2238 | Net Bridge | NEW | $Call |
| 2148 | NetModem V1200 | | $ 489 |
| 2239 | Net Serial | NEW | $Call |
| | PhoneNet Networking Products | | |
| 1739 | • For 128 & 512K /E | | $ 49 |
| 1740 | • For Mac Plus, SE & II | | $ 49 |




Improve your ear for music with **Practica Musica,** an interactive program that makes serious instruction in ear training and music theory fun.

*Works w/512K, Mac Plus, SE & II; includes headphones*

**2260** • From Ars Nova Software

**$89**

write and proofread copy, design a layout, and create camera-ready pages on a laser printer or a phototypesetter. If you don't own a laser printer, you can use one at any of the growing number of copy shops and computer stores that rent time on desktop publishing systems.

With commercial typesetting and graphic arts firms charging $20 an hour and up (*way* up), it doesn't take long for a desktop publishing system to pay for itself. And there's the convenience factor. You can experiment with different designs or make last-minute type corrections in the time it would take to call a typesetting service and place an order. Best of all, the Mac can serve you in other areas when you aren't wearing your printer's apron.

### Toll Road Ahead

But you have to spend before you can save. The road to desktop publishing has a number of alternate routes, and each takes a progressively higher toll on your bank account. The least expensive involves combining the Mac's typographic prowess with conventional pasteup methods. By preparing text with a word processor, printing it on a laser printer, and then pasting it up by hand, you can dramatically reduce your typesetting and production costs, which are often the most expensive part of a job.

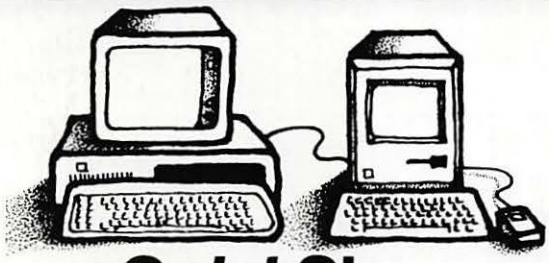
If you're willing to rent time on a laser printer, the only vehicle needed to travel this path is a Mac with a word processor; a 128K Mac and *MacWrite* will do, but I'd suggest at least a two-drive 512K and a more powerful word processor, such as *Microsoft Word* or Ann Arbor Softworks' *FullWrite Professional*–assuming it's been released by the time you read this. (I'll have more to say about software shopping shortly.)

A more direct route, the one most desktop publishers take, involves using a desktop publishing program to paste up pages electronically. Most desktop publishing programs mimic conventional pasteup methods. After you specify basic information about your publication–its page size, number of pages, and whether the final product will be printed on both sides–the program presents you with a blank page into which you can *import* word processing documents and graphics created with drawing or business graphics programs.

The toll: a Mac with at least a megabyte of memory. Few desktop publishing programs run on a 512K Mac; those that do–Target Software's *Scoop,* Orange Micro's *Ragtime,* and Letraset's *ReadySetGo* 4.0–leave only enough free memory for relatively short publications. Again, two disk drives are a must, and a hard disk is preferable. Without a hard disk, prepare for some creative disk-swapping as you transfer files from your word processing and graphics disks to those you use for page layout.

The third route to desktop publishing traverses the same terrain as the second but includes some high-priced stopovers to pick up a large-screen display and a *scanner.* Large-screen displays are just that: big screens that let you view an entire 8½-by-11-inch page (or even two, side by side) without having to scroll (see "Up on the Big Screen," *Macworld,* January 1987, and "Business Buyer's Guide," November 1987). Scanners are add-ons that use optical sensors to convert photographs or other flat artwork into graphic documents (often in

*(continues)*

**QuickShare**

**The Complete High-Speed Connectivity System for a Macintosh and a PC/XT/AT**

- **Saves Time** — Uses extremely fast SCSI-based file transfer.
- **Solves Translation Problems** — Converts any PC formatted text or bit-mapped graphics to Macintosh format.
- **Convenient** — Share PC hard drives or local area networks.
- **Cost Effective** — No additional disk drives required.

**Compatible Systems Corporation**

P.O. Drawer 17220 • Boulder, Colorado 80308
303-444-9532 • Telex 249643

QuickShare is a TM of Compatible Systems Corp., Macintosh and Apple Talk of Apple Computer Inc.

Circle 776 on reader service card

**We RENT Mac Software !!**

**MacStore**TM
1671 Executive Dr.
New Braunfels
Texas 78130

National **800-847-0026**

Ask about our frequent renter program !

**We'll match any software rental price in this issue.**

We have hundreds of other titles available for the Mac. If you don't see what you want - call us !

| | | | |
|---|---|---|---|
| Accessory Pak 1 or Art Grabber | 8.80 | Mac Golf | 9.10 |
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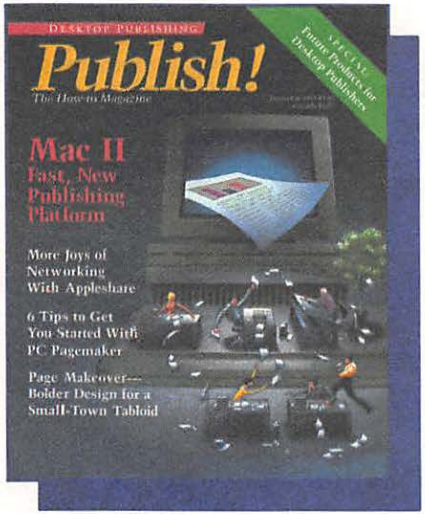


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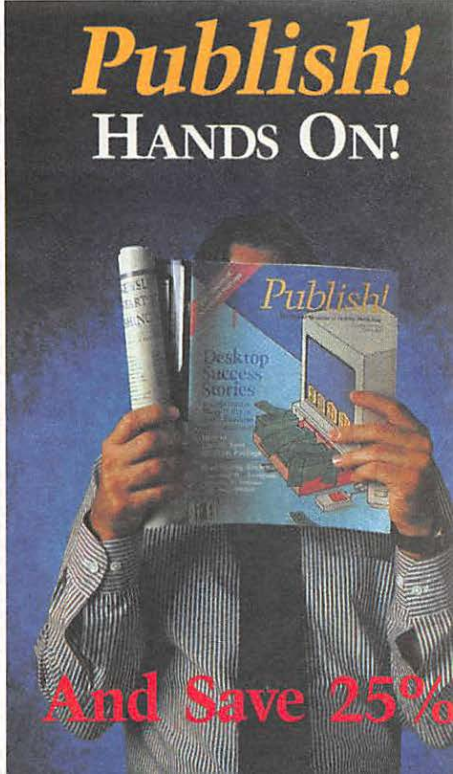

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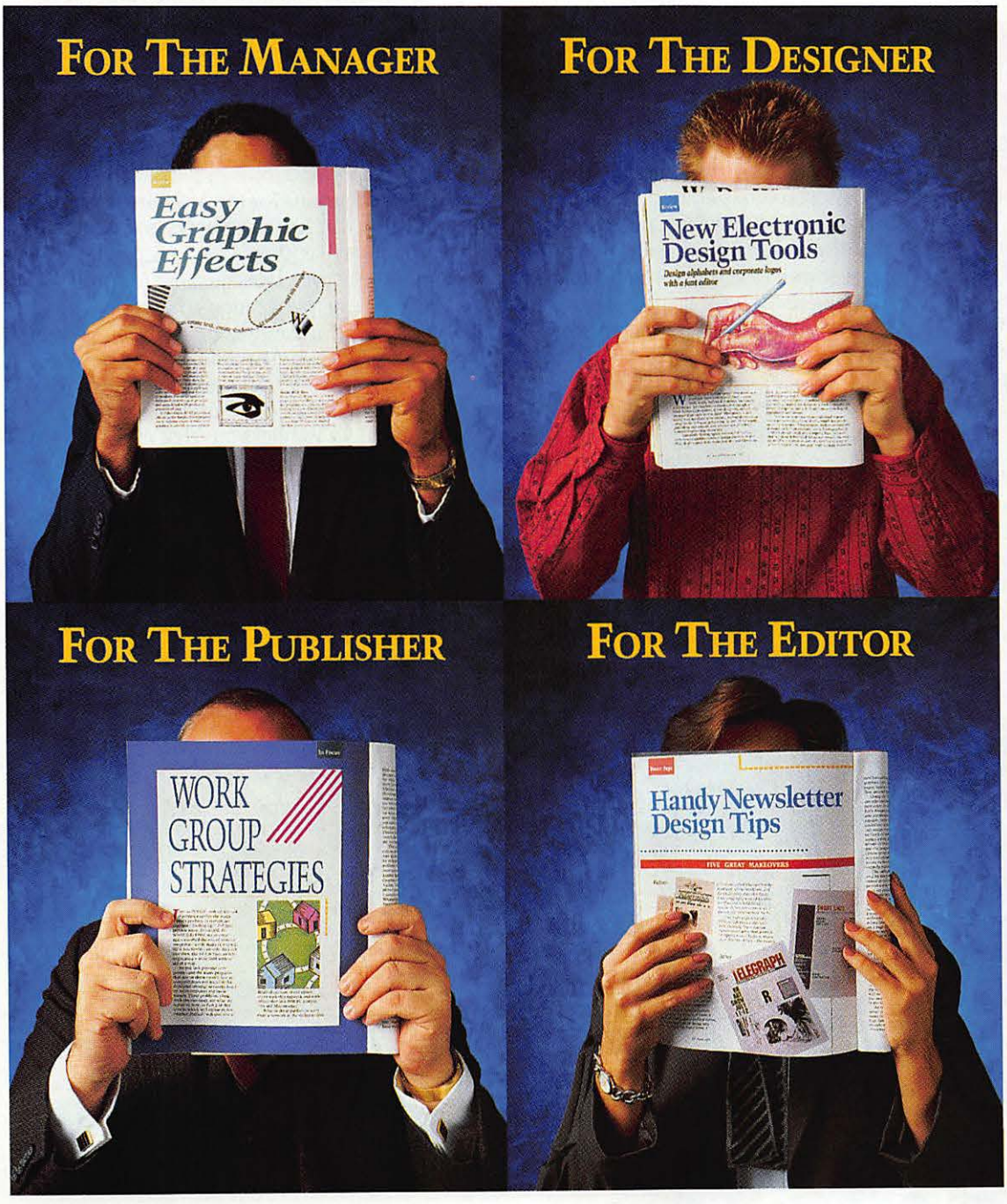


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*MacPaint* format) in which the original image is represented by a series of dots (see "Scanning the Horizon," *Macworld,* July 1987, and "Shades of Gray," January 1988). Scanners range in price from $249 for Thunderware's ThunderScan (which replaces the ribbon cartridge in an ImageWriter printer and can scan any image that will roll through the printer's carriage) to over $2500 for scanners such as Microtek's MS-300A, which can produce 300-dots-per-inch (dpi) images that look as good as a high-quality newspaper photo.

Expensive scanners can earn their keep in another way: when driven by the appropriate software, they become *optical character recognition* (OCR) devices, able to "read" typed or typeset pages of text from which they create disk files you can edit and reformat with a word processor.

### The Software Side

When surveying desktop publishing programs, you'll encounter two basic types: *interactive* programs that let you use the mouse to position text and graphic elements and that show you on screen how the final page will appear, and *code-oriented* (also known as *command-driven* or *batch-processing*) programs that require formatting codes in the text.

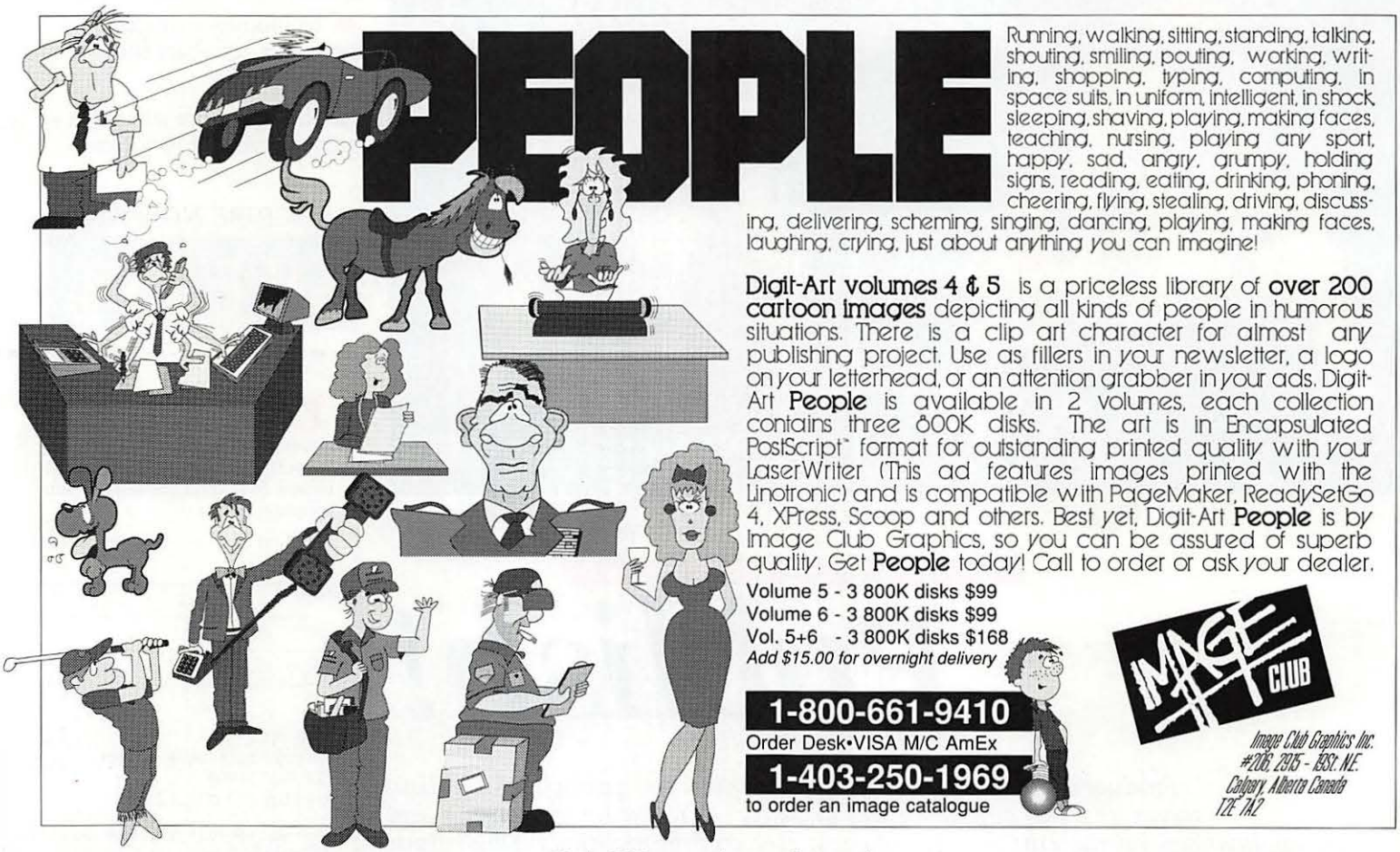
The former genre is easier to use and jibes well with the Mac's what-you-see-is-what-you-get (WYSIWYG, pronounced *wizzy-wig*) philosophy. Most Mac desktop publishing programs fit into this category and offer similar features: on-screen rulers for measuring and aligning elements, the ability to import word processing documents with formatting attributes intact, rudimentary text-editing for making corrections or typing short passages, and formatting commands that let you change the appearance of text and create tables.

Interactive publishing programs can also import graphic documents saved in the most common formats, and they provide tools for drawing rules, boxes, and circles. Some also let you create *spot color*—a single color dropped into certain page elements (such as a headline or a horizontal bar) used to grab readers' attention. When you print a publication containing spot color, the program prints a separate sheet of paper for each color. Each sheet contains *registration marks* that a printer will use to align colors.

With code-oriented programs, typed codes such as \hsize=155mm replace the mouse and menus for positioning and formatting text. This makes them more difficult to use; indeed, you'll need mountain-climbing gear to scale the learning curve of programs like FTL Systems' *MacTeX* or Knowledge Engineering's *JustText.* But there are rewards at the summit. Not only can code-oriented programs create documents of virtually unlimited size, they can also automatically create footnotes, tables of contents, and indexes. Most code-oriented programs for the Mac also provide a preview window that shows how the final product will appear.

These programs are best for producing large publications that require a consistent appearance throughout, such as books and training manuals. And because their formatting codes are embedded in the original text, code-oriented programs are ideal for publications that need frequent revision. If you're producing complex technical publications that include mathematical equations, a program based on the TeX (pronounced *tek*) typesetting language is probably your best bet.

*(continues)*

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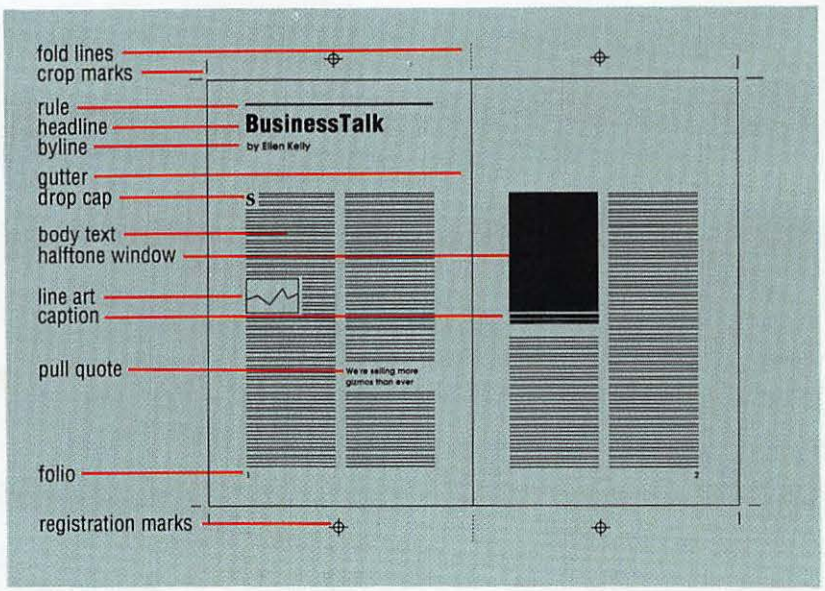
# Layout and Pasteup the Old-Fashioned Way

Before you can fully grasp what desktop publishing is, you should learn how printed materials are produced without it. Initially a graphic designer develops a concept by drawing rough, or *thumbnail,* sketches. Later, comprehensive drawings, called *comps,* are produced, which show how the final piece will look.

Next the designer chooses the typefaces and type sizes for the text, using a process called *copyfitting* to make sure it will fit the available space. From there, the text is *marked up* with specifications for line lengths, *fonts* (a typeface in a particular size), and spacing. The typesetter may key in the text from the marked-up copy or convert the author's disk files, adding the necessary typesetting codes.

The layout artist then creates a *dummy,* a preliminary layout that shows how and where the text and graphics will go on each page. The artist refers to the dummy when pasting up the finished type on cardboard sheets, using T squares, triangles, and sharp eyes to make sure everything's straight. If the design calls for them, the artist will draw lines (called *rules*) with a drafting pen, or add stick-on *rule tape* (clear adhesive tape on which rules have been machine drawn).




***Elements of a Page***
*The pasted-up page, called a* mechanical, *as it should look when it's camera ready–with headlines and body text aligned, line art and halftone windows in place, and crop marks, registration marks, and fold lines to guide the printer.*

If the page includes photographs, a screened negative for a *halftone* must be made from each photo to convert its various shades into dots that can be printed. The artist cuts a matching *window* from opaque film (such as Parapaque or Zipatone) and pastes it down on the board to show the printer where to position the halftone. *Line art*–graphs or line drawings–does not require halftones.

The artist then draws *crop marks* to denote the page's boundaries and may attach a protective sheet of tissue paper on which to mark ink colors or paper stock. Finally, when the cardboard sheet (called a *mechanical*) is *camera ready,* the printer shoots an actual-size negative from which the printing plate is made.

With the boundaries increasingly blurred between text processing and publishing, the best desktop publishing program for your application may actually be a word processor. Microsoft's *Word* 3.01, Ann Arbor Softworks' *FullWrite Professional,* and WordPerfect Corporation's *WordPerfect* can create footnotes, tables of contents, and indexes. (At press time, though, neither *FullWrite* nor *WordPerfect* had actually been released.) *Word* also offers a set of codes for creating mathematical equations. *FullWrite* will include drawing features and the ability to *wrap* text around an irregularly shaped graphic.

The best way to find a desktop publishing program is to assess your needs, then find the program that best meets them –and whose operating style you can live with. You can find advice on some typical applications and the programs that are best suited to them in "The Desktop Publishing Shopper," *Macworld,* September 1987. For an introduction to graphics and drawing programs–you'll want one of them, too, if you plan to include graphics in your publications–see "Getting Started with Macintosh Graphics," *Macworld,* August 1987.

### Putting the Issue to Bed

Before you take the desktop publishing plunge, prepare yourself: it's hard work. The Mac makes producing an attractive, readable page easier than it used to be, but that doesn't mean it'll be a breeze. For desktop publishing you won't need as firm a grasp of technical concepts as you would

*(continues)*

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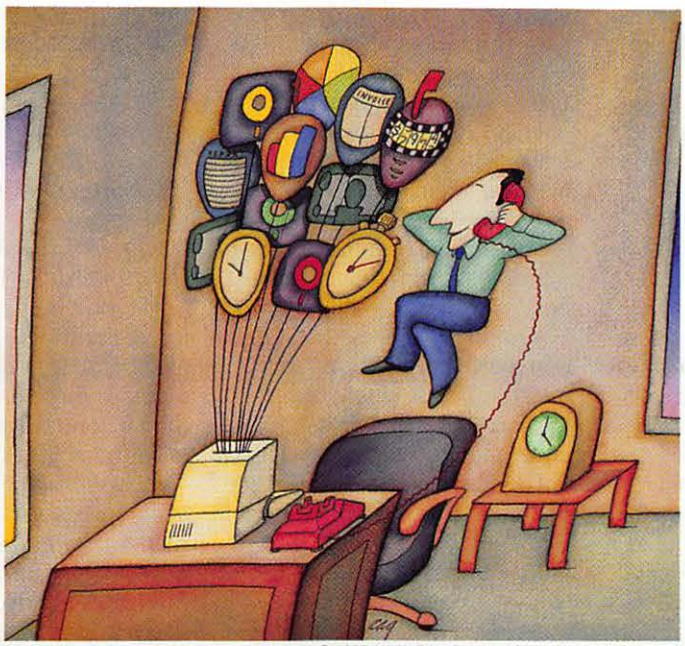

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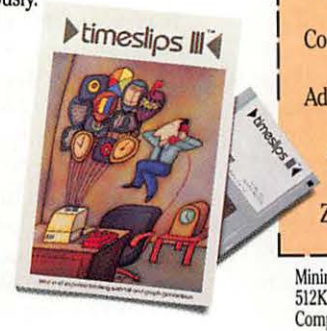


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## Type Tips

I acquired an appreciation for fine typography while working for Davis & Warde, a 100-year-old printing company in Pittsburgh, where I learned the trade from old-school masters who wore visors and referred to text as "matter." Headline matter, body matter, it didn't matter—no job was too complex. There an apprentice typographer started out melting down old type into lead bars, and loading and unloading 75-pound font "magazines" into Linotype machines.

The death of hot-metal type forced Davis & Warde to make the painful transition to "cold" type. They succeeded, partly because they knew the basics of quality typography that transcend technology. Here are some ways to follow that tradition on the Mac:

- *Use em and en dashes.* Use these instead of double hyphens. To get an *em dash* (—) on the Mac, press Option-Shift-hyphen; for an *en dash (–),* press Option-hyphen. An en dash is used to express a range, standing for *to* between numbers or words.
- *Use true quotes.* Press Option-] and Shift-Option-] for open and close single quotes; for double quotes, press Option-[ and Shift-Option-[. (Also, put commas and periods inside quotation marks; colons and semicolons outside.) To get "curly" quotes without those hand-cramping command sequences, try Deneba Software's *Laser Quotes* (a public domain Init file), *mini-Writer* (shareware by Maitreya Design), or *Smart Quotes* (a shareware DA by Oak Square Publications).
- *Don't put two spaces after punctuation.* Put only one space after periods, colons, and semicolons.
- *Don't use a lowercase l for the numeral 1.* Though similar on a typewriter, they look different in typographic fonts. And because the *l* is narrower than the *1* in most fonts, using the *l* will misalign number columns in tables.
- *Hyphenate judiciously.* Make sure words break correctly—between syllables. Try not to end more than two or three consecutive lines with hyphens,and avoid two-letter divisions (on-ly, un-til).

### The Right Type

| Punctuation | Symbol | Command Sequence | Example of Usage |
|---|---|---|---|
| em dash | — | Shift-Option-hyphen (-) | I'll be back—just you wait. |
| en dash | – | Option-hyphen (-) | the New York–Chicago flight |
| quotation marks | " " | Option-open bracket ([)<br>Shift-Option-open bracket ([) | "Less is more." |
| single quote/ apostrophe | ' ' | Option-close bracket (])<br>Shift-Option-close bracket (]) | "Have you read 'The Monkey's Paw'?" |

for telecommunications or relational-database management, but you will need to develop an awareness of design and typography.

One way to get off to a good start is to hire a graphic designer to create a conceptual framework—a foundation on which you can build each issue. Many desktop publishing software companies also sell "canned" template documents for common publishing jobs like newsletters and reports. Even with one of these approaches, however, the quality of your publication's typography is still up to you (see "Type Tips"). You'll need a standard dictionary (such as *Webster's Ninth New Collegiate Dictionary,* Merriam-Webster, 1986) and a style manual (*The Chicago Manual of Style,* University of Chicago Press, 1982, or *Words into Type,* Prentice-Hall, 1974) to get spelling, word breaks, grammar, and punctuation right. To learn more about the printing process, see "First Edition," *Macworld,* August 1987.

When you start up that page-layout program, you assume a responsibility for conveying ideas in an aesthetically pleasing way, both visually and verbally. Ignore that responsibility and you ignore centuries of printing tradition. And it isn't just the designers and typographers of the world who'll notice. The unconscious minds of your readers are excellent judges of good design and typography. Don't let them find you guilty of crimes against legibility. The sentences they'll impose will be to ignore yours. □

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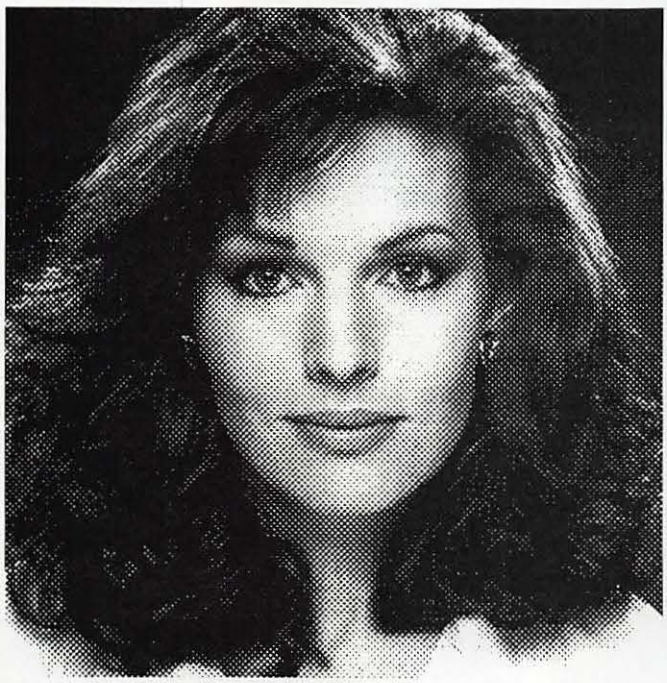

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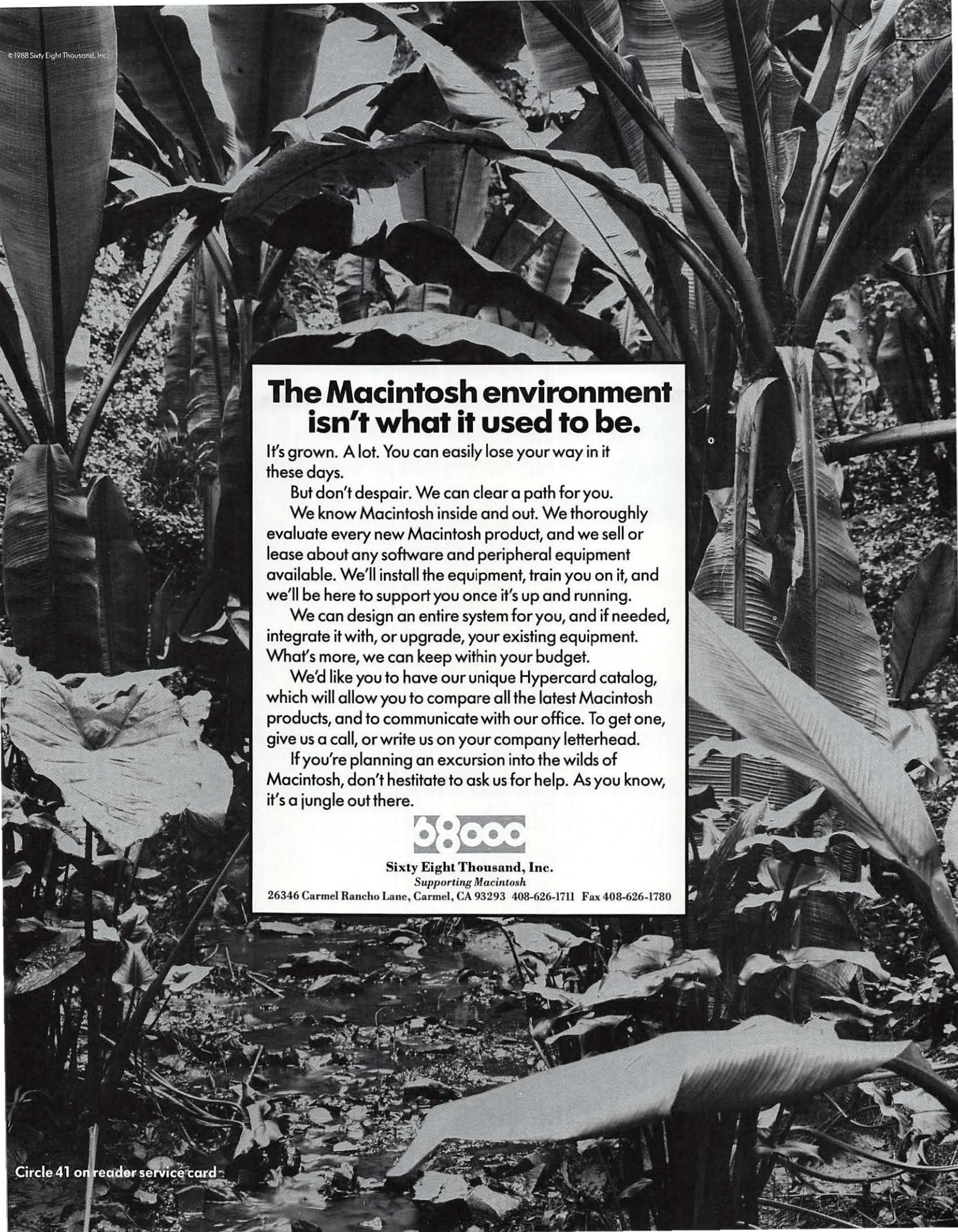
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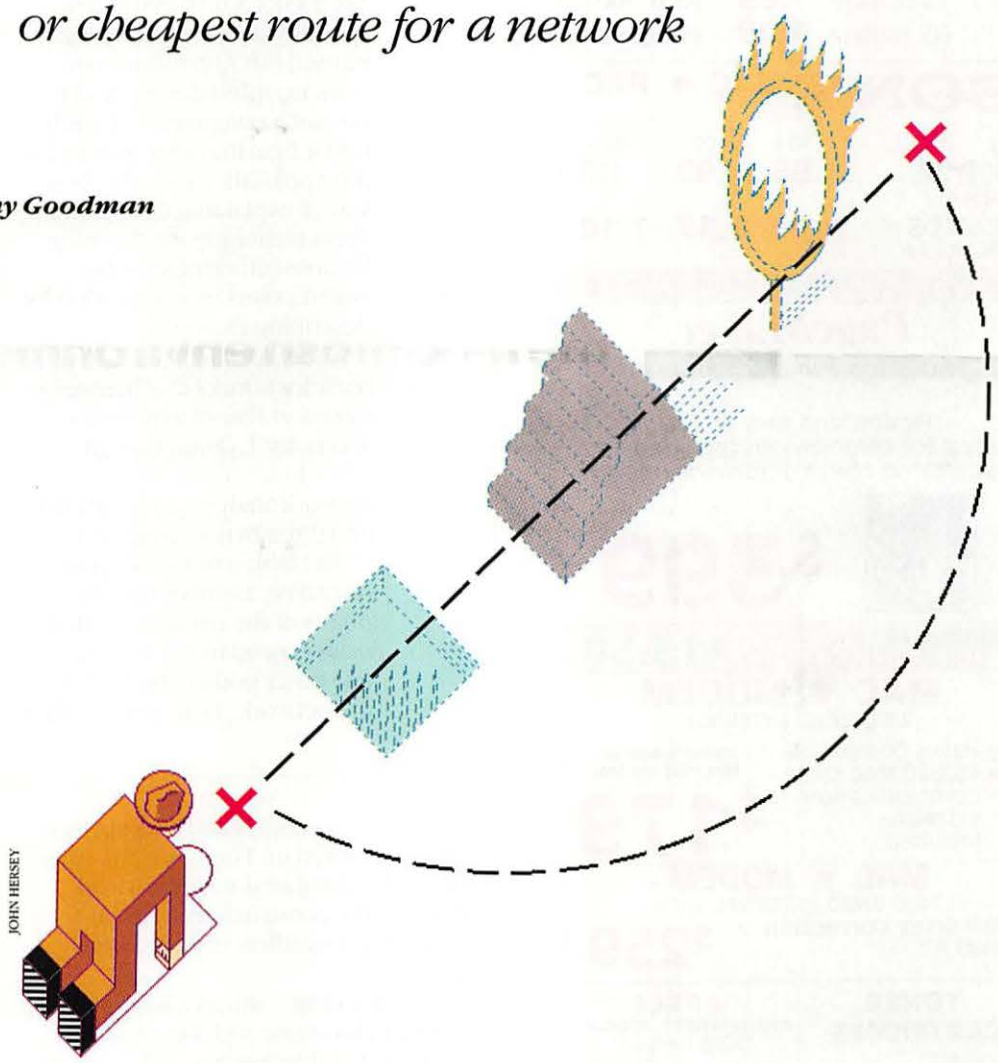
# Business Clinic

## *An Excel macro picks the fastest or cheapest route for a network*

***by Danny Goodman***



JOHN HERSEY

The business problem I tackle this month crops up in many different guises–devising an itinerary for a whirlwind trip, laying a pipeline or cable efficiently, or instantly dispatching ambulances on the quickest route. It's one of those areas that you intuitively know must have a computerized solution, but you don't know where to start. Spreadsheet jockeys call it *network analysis,* but it's basically choosing the shortest distances among points in a group (see "What Is Network Analysis?").

Distance doesn't always mean geographical distance. Going from point *A* to point *B* may be more efficient through point *C*–if you look at it in terms of time or money.

For instance, electrical power lines running directly from a new residential development to the utility's substation might cover only a short distance. But that direct connection might entail expensive land acquisitions or costly engineering workarounds. Under network analysis, it might emerge that a roundabout route is a more cost-effective way of connecting the new neighborhood to the power grid.

Or consider time as a measure of distance. For instance, a company might have several branch offices that send documents to each other daily by air courier. The number of hours between document preparation at one office and delivery at another office may be more critical than cost. The airline that handles the package may fly directly from the Indianapolis node of the office network to the home-office node in New York only once each day at 2 p.m. But if it's sent on a two-hop trip via an 11 a.m. flight to Chicago, where there is more frequent service to New York, the package might reach the home office faster even though it covers more miles.

Of course, you can do these simple examples in your head. But when the number of nodes and links expands, it's time to summon the computer to look at all the possibilities and show you which connections make best use of resources. Moreover, if the cost or time along a particular branch increases, a computer recalculation instantly finds the best new connection path–and perhaps saves money in the process.

To demonstrate network analysis on the Macintosh, I'll show you how to set up a minimal-spanning-tree worksheet and macro in *Microsoft Excel.*

### The Scenario

The goal of a minimal-spanning-tree network is to keep the total distance (whether physical distance, cost, time, or other critical resource) to a minimum. Also, in a minimal-spanning-tree analysis, any node can be the center of the network: any node can be a generator or consumer of whatever flows through the network. The branches serve as pipelines between nodes.

So let's hypothesize a corporate campus scattered with eight buildings of various sizes and vintages. Our job is to construct a new hazardous-waste collection system that links all buildings. The network branches will be underground pipes that carry the waste to a collection point somewhere on the network. While the physical distance between nodes affects the cost of each branch, other considerations, such as higher construction costs for

*(continues)*

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# What Is Network Analysis?

No, it's not a new psychiatric specialty devoted to helping burned-out *AppleShare* network troubleshooters. And it's not just a computerized method for figuring out where to lay the AppleTalk cable. The best way of explaining this spreadsheet technique for choosing the most efficient links between points in a network is by describing examples.

As detailed in a wonderful book for Lotus *1-2-3*-literates–*Decision Power with SuperSheets,* by T. Owen Carroll (Dow Jones-Irwin, 1986)–network analysis problems fall into three major categories.

The first, a *minimal spanning tree,* assumes that the points of the network (called *nodes*) need to tap into just one other node to be part of the network. That means either that the connections, called *branches,* are bidirectional–like electrical cable or roads–or that the flow goes one direction at all times, like an oil pipeline. In both cases, where the node connects to the network doesn't matter as long as it attaches. This is the type of network I describe in the column this month.

The second type, the *shortest-route network,* selects the shortest distances from a hub to remote locations, as in, for example, an ambulance dispatching system.

The third network type, the *optimal tour,* calculates the most efficient round trip through a number of remote points, for instance, figuring the shortest route for a delivery vehicle's daily rounds.

digging under roadways and parking lots, should be factored in. Therefore, the "distances" to be compared in this network analysis are the construction costs between nodes, regardless of the physical distance.

"Where to Dig?" shows a schematic of the building locations and the estimated cost of each feasible pipeline link between them. Each building has a name, which the network-analysis worksheet uses in its calculation.

### Analyzing the Network

Calculation of a minimal spanning tree starts with finding the shortest *branch,* or connection between two nodes, in the network. The two nodes attached by that branch are then *labeled* to incorporate them into the network. Then potential branches from those labeled nodes are examined to find the shortest one. The new branch is added to the network, and the process continues until all the nodes are labeled and connected. The repetition involved in this calculation is handled by an *Excel* macro associated with the worksheet.

The worksheet appears simple for a good reason: it is (see "Shortest Distance"). Its complex parts are hidden in the macro, making the worksheet more inviting for managers who need to see a report. First enter the costs and building names on the Data Input side of the sheet. Once the data is entered, type Option-⌘-F to start the macro (or choose calc.network from the Macro menu). The macro picks out the "shortest" branches one by one and copies them to the Results side of the sheet, finally placing the total at the bottom of column F. For clarity, "Shortest Distance" shows both the input data and results on the same worksheet, but in practice the input data disappears one node at a time as the macro runs and fills in the Results side.

In this model the macro does all the work. Since it's the heart of this technique, I'll describe the macro in some detail to allow you to modify it for your own purposes.

Though no formulas appear on the main worksheet, you must define some

*(continues)*

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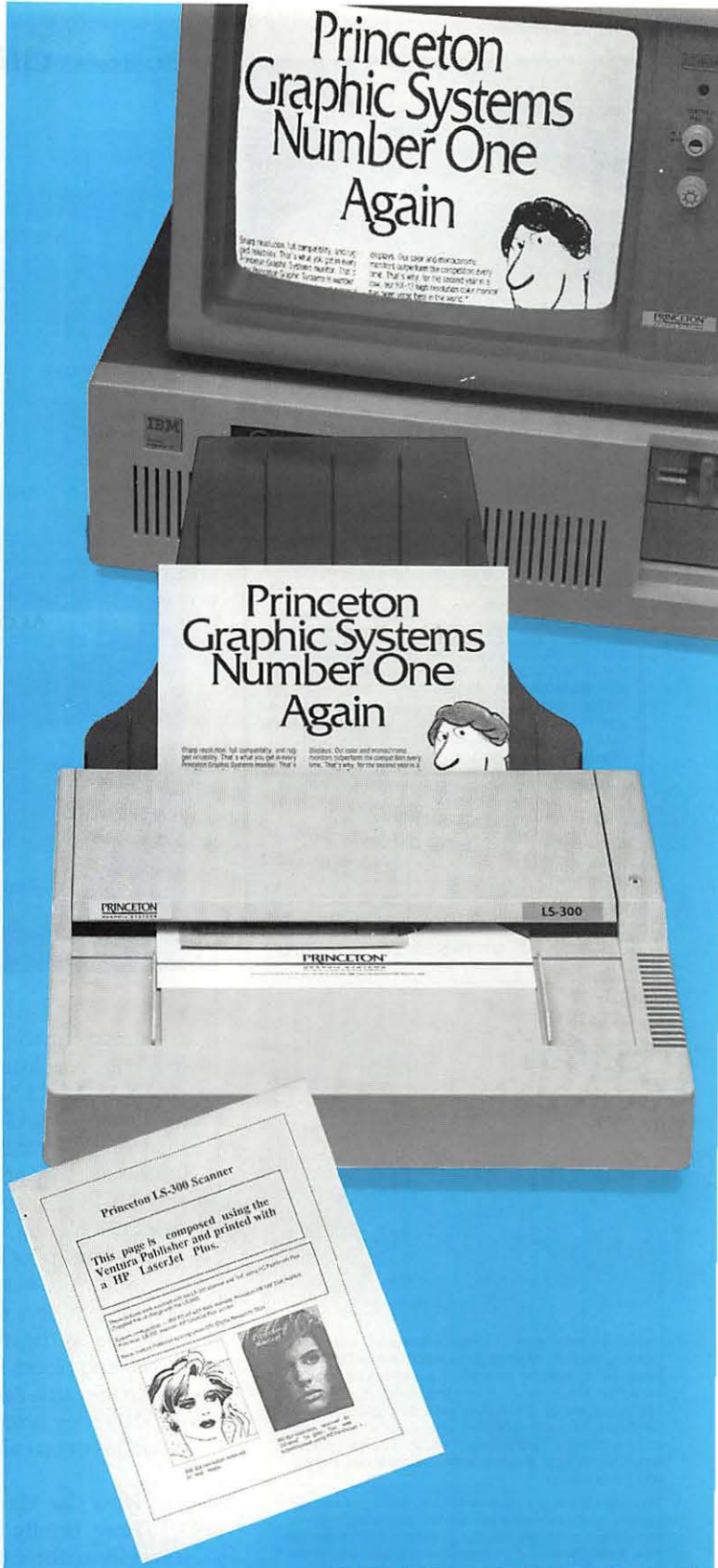


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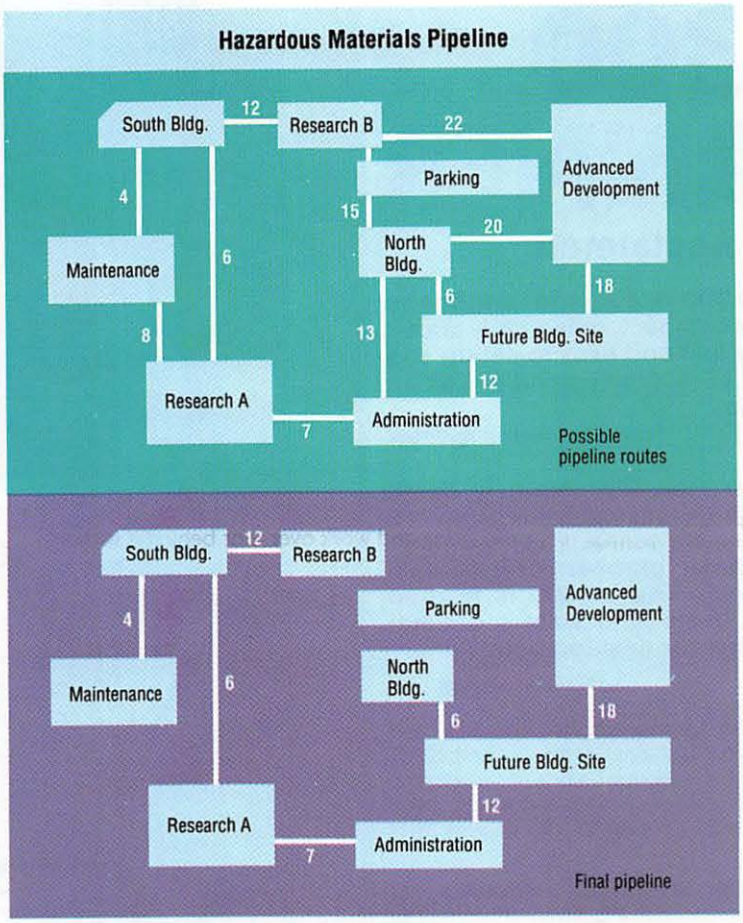


***Where to Dig?***
*Start analyzing the best pipeline route by identifying the buildings and all possible branches between them. Assign values to the distances; in this case the "distances" are actually construction costs in thousands of dollars. Connect the buildings according to the worksheet results to find the most efficient network path.*

cell ranges on the worksheet before starting. They are distance ($A$7:$A$32), input ($A$7:$C$32), results ($F$6), and top.distance ($A$6). For networks larger than 25 nodes, increase the row numbers for the distance and input ranges.

Listing 1 shows the macro for the network calculation, divided into calc.network, setup, post.label.A, and post.label.B.

Since the macro must keep track of several numbers while it grinds away, several cells on the macro sheet are set aside as holding places for temporary values. "Macro Scratch Pad" shows these cells and the data they hold after the pipeline network has been calculated.

### How the Macro Works

Here, briefly, is what happens when you activate the calc.network macro.

The first task is to perform some setup operations, including selecting and sorting all the distance data. Then the macro storage cells are set to *0*, while macro cell C1 is assigned the name recent.label for this round of calculations.

From there, the macro selects the first distance listed in the worksheet. As long as there is data to test, the macro continues with lines A5 and A6, which temporarily place the names of the two nodes being tested into the macro worksheet cells.

Long formulas in macro lines A7 and A8 check to see if either node has been labeled yet by looking for a match in the list of labeled nodes accumulated in macro sheet column C. If the node has not been labeled, the macro places a *1* in the node flag cell, otherwise it places a *0* in the cell.

The formula in macro line A9 defines the group of three worksheet cells containing the distance and node names as "marker," because the macro may need to select these cells later for copying and pasting, depending on the result of the following three IF formulas.

In A10, the macro tests whether both nodes have been labeled by checking the state of the two flag cells. If both have been labeled, the macro jumps ahead to cell A22, where the three cells on the main worksheet are selected and deleted from the list—that branch is not valid because those nodes are already in the network.

*(continues)*

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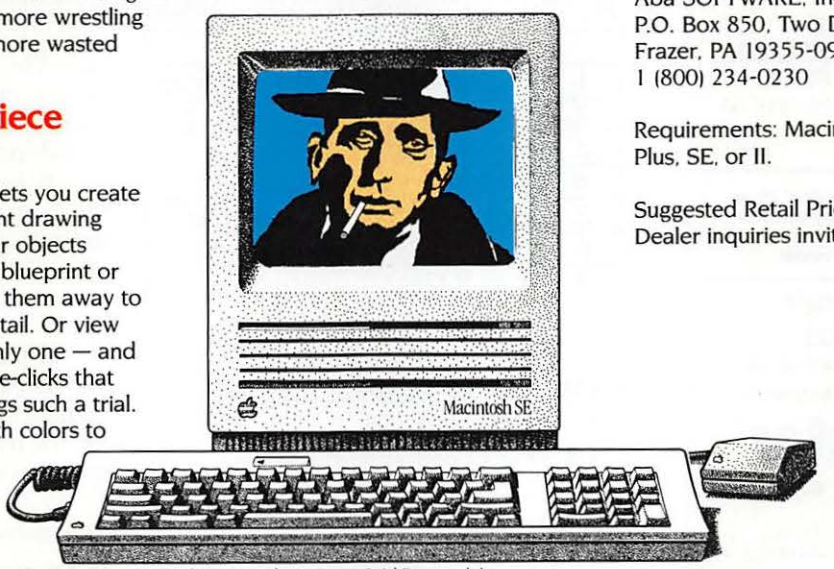


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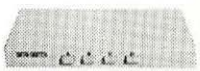

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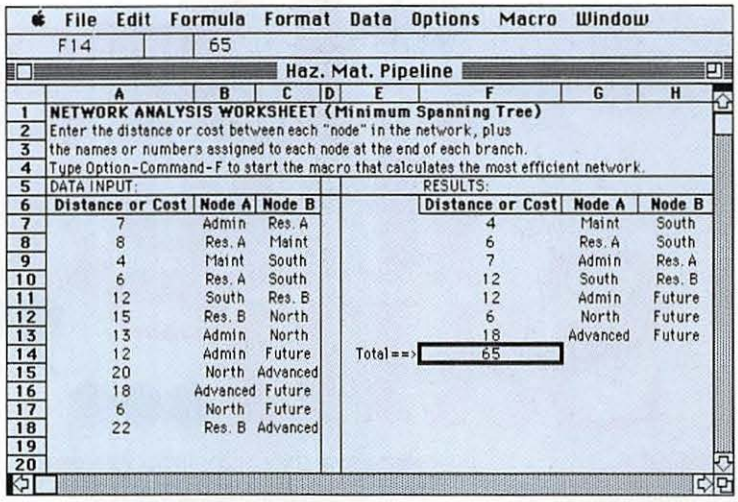

File Edit Formula Format Data Options Macro Window

F14 | 65

Haz. Mat. Pipeline

NETWORK ANALYSIS WORKSHEET (Minimum Spanning Tree)
Enter the distance or cost between each "node" in the network, plus
the names or numbers assigned to each node at the end of each branch.
Type Option-Command-F to start the macro that calculates the most efficient network.

DATA INPUT:

| Distance or Cost | Node A | Node B |
|---|---|---|
| 7 | Admin | Res. A |
| 8 | Res. A | Maint |
| 4 | Maint | South |
| 6 | Res. A | South |
| 12 | South | Res. B |
| 15 | Res. B | North |
| 13 | Admin | North |
| 12 | Admin | Future |
| 20 | North | Advanced |
| 18 | Advanced | Future |
| 6 | North | Future |
| 22 | Res. B | Advanced |

RESULTS:

| Distance or Cost | Node A | Node B |
|---|---|---|
| 4 | Maint | South |
| 6 | Res. A | South |
| 7 | Admin | Res. A |
| 12 | South | Res. B |
| 12 | Admin | Future |
| 6 | North | Future |
| 18 | Advanced | Future |
| Total==> 65 | | |

***Shortest Distance***
*On the spreadsheet, enter the distances and building names for each prospective branch. The macro in Listing 1 selects the branches and lists them in the Results section.*

Then the macro loops back to cell A3, where it starts again with the next item in the list to search for the shortest branch not yet connected to the network.

If one or both nodes of a potential branch are unlabeled–not yet connected to the network–the macro continues to line A11. This line of the macro further tests the branch. If the macro encounters two unlabeled nodes, it skips that branch, because the object of the macro is to find the shortest branch from a labeled node to an unlabeled node. This presents a problem for the very first branch because none of the nodes are labeled when the macro begins. Line 18 of the macro automatically makes the first branch part of the network. When neither node is labeled in subsequent tests, the formula in A12 skips to the next branch.

| | B | C |
|---|---|---|
| 1 | Test Node A: | Labeled Nodes: |
| 2 | Res. B | Maint |
| 3 | Test Node B: | South |
| 4 | Advanced | Res. A |
| 5 | Node A Flag: | Admin |
| 6 | 1 | Res. B |
| 7 | Node B Flag: | Future |
| 8 | 1 | North |
| 9 | Total Branches: | Advanced |
| 10 | 7 | |
| 11 | Total Distance: | |
| 12 | 72 | |
| 13 | | |

***Macro Scratch Pad***
*The macro uses cells in columns B and C of its macro sheet for temporary storage of values.*

If one node is labeled, the macro moves on to line A14, and you begin to see action in the main worksheet.

The first action is selecting the three cells defined as "marker" and copying them. Then the macro selects the first available slot in the results region (using the number of total branches to calculate the vertical offset from cell $ F$ 6, Results) and pastes the values into the right side of the worksheet.

Next the macro performs some cleanup work within the macro sheet, advancing the total branches counter (the formula in A18) and adding any newly labeled node to the list of labeled nodes (formulas A19 and A20 and macro modules post.label.A and post.label.B). Since the active cell on the main worksheet (the distance value in the Results section) contains the new distance or cost added to the network, this value is accumulated in the Total_Distance storage cell on the macro sheet (the formula in A21). Then the branch in the data input section is deleted before the macro loops back to its line A3 to inspect the next branch on the list.

If there are no branches left to test on the main worksheet, the macro jumps to line A25 and puts the accumulated distance in the Total_Distance holding cell at the bottom of the Results column.

### Interpreting the Results

To map the results, start with a diagram of the unconnected buildings. Then use the data to connect them, drawing a line between each pair of buildings in the

*(continues)*

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|---|---|
| 2 | =setup() |
| 3 | =SELECT(OFFSET(!top.distance,1,0)) |
| 4 | =IF(SELECTION()="",GOTO(A25),) |
| 5 | =SET.VALUE(Test_Node_A,OFFSET(SELECTION(),0,1)) |
| 6 | =SET.VALUE(Test_Node_B,OFFSET(SELECTION(),0,2)) |
| 7 | =IF(ISNA(MATCH(Test_Node_A,Labeled_Nodes,0)),SET.VALUE(Node_A_Flag,0),SET.VALUE(Node_A_Flag,1)) |
| 8 | =IF(ISNA(MATCH(Test_Node_B,Labeled_Nodes,0)),SET.VALUE(Node_B_Flag,0),SET.VALUE(Node_B_Flag,1)) |
| 9 | =DEFINE.NAME("marker",SELECTION():OFFSET(SELECTION(),0,2)) |
| 10 | =IF(AND(Node_A_Flag=1,Node_B_Flag=1),GOTO(A22),) |
| 11 | =IF(Total_Branches=0,GOTO(A14)) |
| 12 | =IF(AND(Node_A_Flag=0,Node_B_Flag=0),SELECT(OFFSET(SELECTION(),1,0)),GOTO(A14)) |
| 13 | =GOTO(A4) |
| 14 | =SELECT(!marker) |
| 15 | =COPY() |
| 16 | =SELECT(OFFSET(!results,DEREF(Total_Branches)+1,0)) |
| 17 | =PASTE() |
| 18 | =SET.VALUE(Total_Branches,Total_Branches+1) |
| 19 | =IF(Node_A_Flag=0,post.label.A()) |
| 20 | =IF(Node_B_Flag=0,post.label.B()) |
| 21 | =SET.VALUE(Total_Distance,Total_Distance+ACTIVE.CELL()) |
| 22 | =SELECT(!marker) |
| 23 | =EDIT.DELETE(2) |
| 24 | =GOTO(A3) |
| 25 | =SELECT(OFFSET(!results,DEREF(Total_Branches)+1,-1)) |
| 26 | =FORMULA("Total==>") |
| 27 | =SELECT(OFFSET(SELECTION(),0,1)) |
| 28 | =FORMULA(DEREF(Total_Distance)) |
| 29 | =RETURN() |
| 30 | |
| 31 | setup |
| 32 | =SELECT(!input) |
| 33 | =SORT(1) |
| 34 | =SET.VALUE(Total_Branches,0) |
| 35 | =SET.VALUE(Total_Distance,0) |
| 36 | =SET.VALUE(Labeled_Nodes,"") |
| 37 | =SET.NAME("recent.label",$C$1) |
| 38 | =RETURN() |
| 39 | |
| 40 | post.label.A |
| 41 | =SET.NAME("recent.label",OFFSET(recent.label,1,0)) |
| 42 | =SET.VALUE(recent.label,Test_Node_A) |
| 43 | =RETURN() |
| 44 | |
| 45 | post.label.B |
| 46 | =SET.NAME("recent.label",OFFSET(recent.label,1,0)) |
| 47 | =SET.VALUE(recent.label,Test_Node_B) |
| 48 | =RETURN() |

***Listing 1***

*These macros analyze the proposed pipeline segments one by one to find the best way to connect all the buildings.*

Results section of the worksheet (see "Where to Dig?"). That's your finished network.

You can use a spreadsheet's "what-if" capability for network analysis. For instance, if the pipeline contractor discovers that connecting the North Building to the Future Building would cost $10,000 more than originally thought, you could recalculate the network and find that a slightly different connectivity path would link all buildings for only $7000 more, saving $3000. You may want to examine the network for other criteria. What if a proposed local ordinance passes and makes rapid collection and disposal more critical than construction cost? Then you'd analyze the amount of time it takes for material to flow from node to node. The resulting map would show the buildings connected by the quickest links rather than the least expensive ones.

The aspect of minimal-spanning-tree network analysis that appeals most to me is that it encourages you to look at a strictly number-crunching problem with a real-object, overhead view. Repetitive calculations are handled by the worksheet, leaving you with simple results that literally connect the dots, and maybe save money in the process.

And yes, of course you can use network analysis to find the shortest path for an AppleTalk network cable in your office. □

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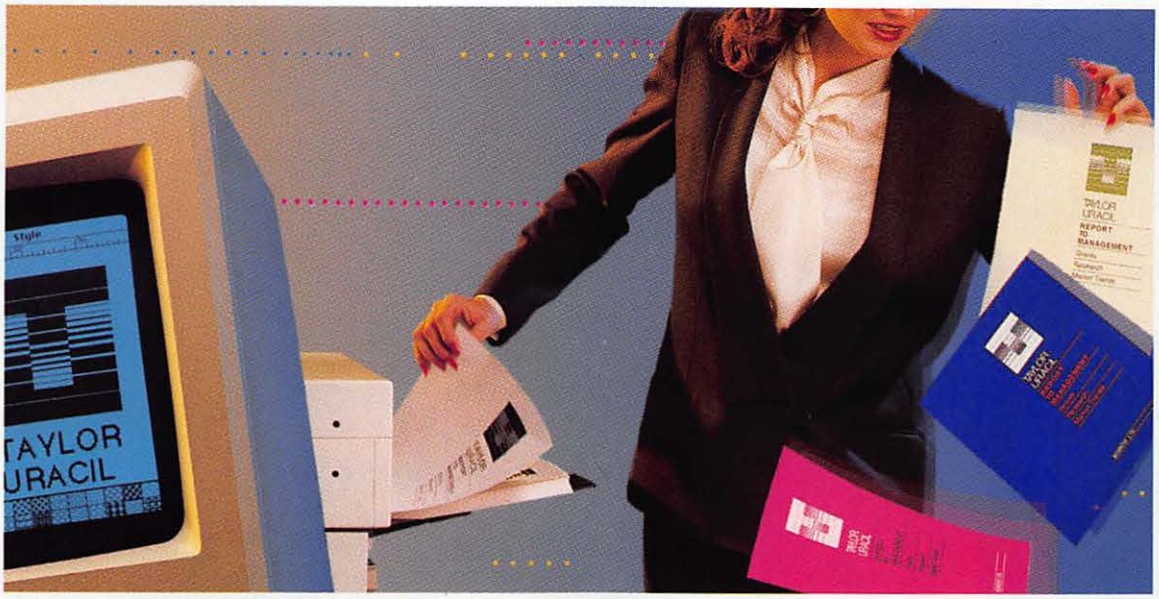


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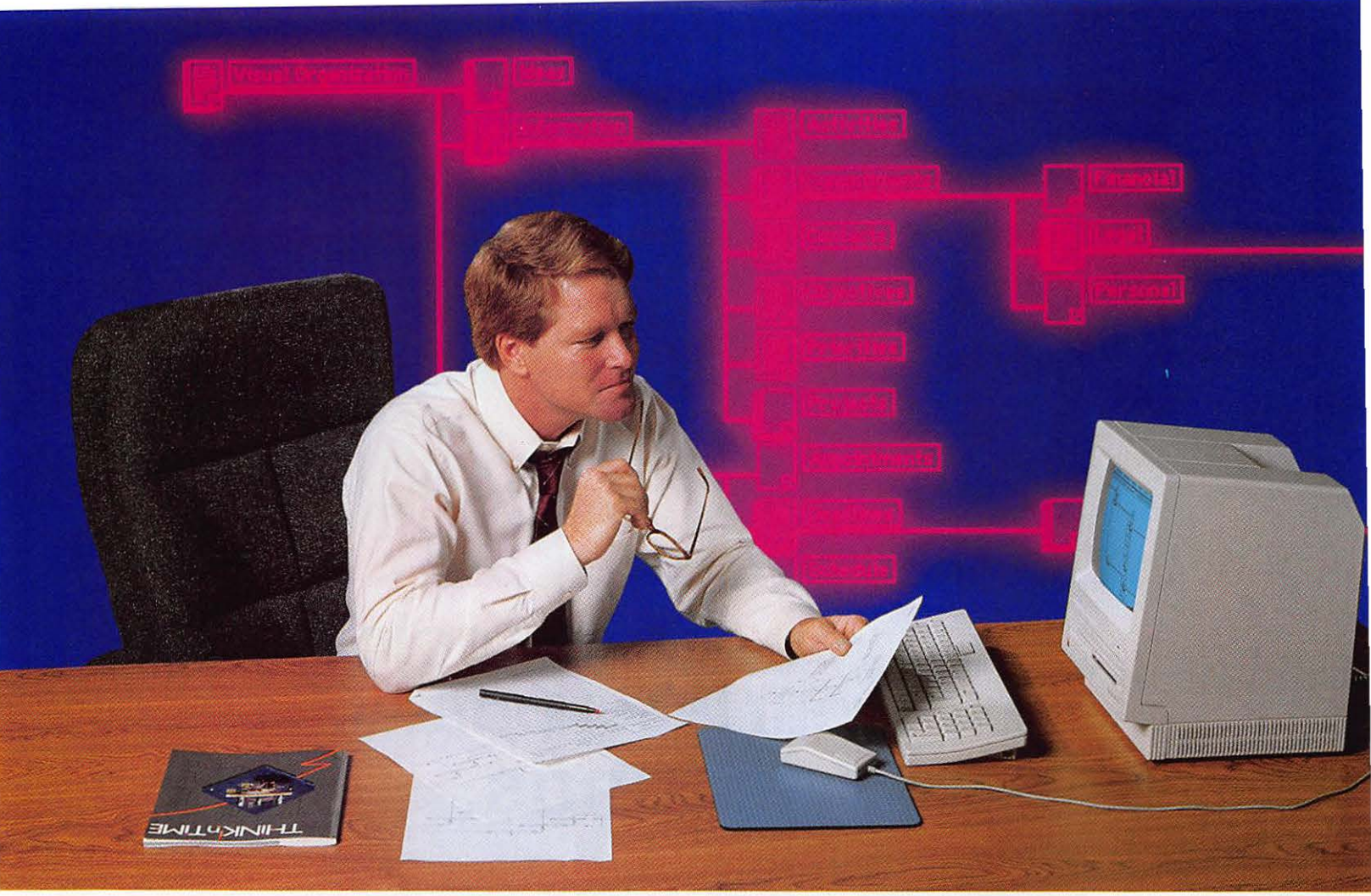

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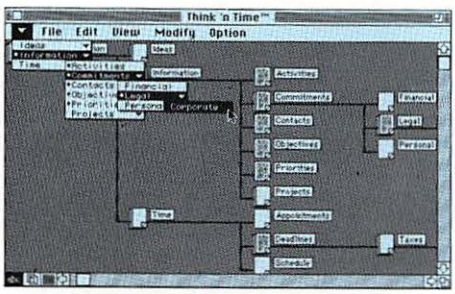


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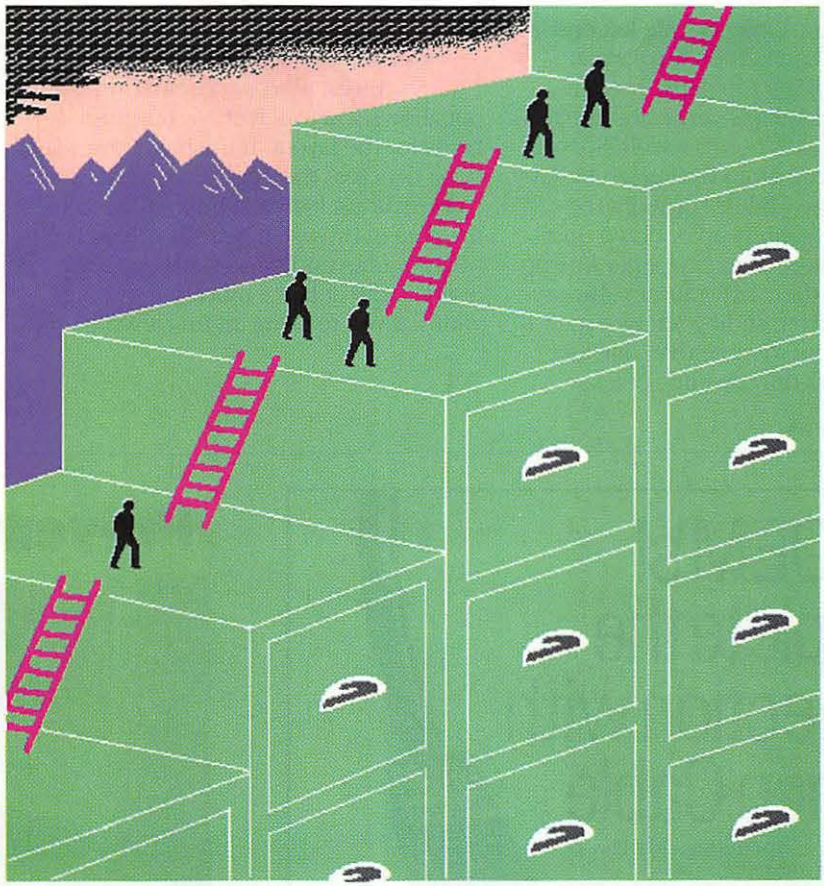
# Insights on FileMaker Plus

*Tips and techniques for smoother database management*

***by Laurence Kirsch***

Over the past couple of years, Nashoba Systems' *FileMaker Plus* has gained a legion of loyal followers because it embodies the best traits of all good Macintosh software. It's easy to use, yet powerful in features and operation. *FileMaker Plus* is probably the easiest entry into database software you'll ever find–aside from browsing through a *HyperCard* stack. But it's also a powerful database manager capable of handling big jobs. Searching, sorting, calculated fields, even lookups, are all easy to perform. And the flexibility of its layouts makes it perfect for just about anything printed on a form–from expense reports to purchase orders to invoices.

But, no doubt about it, there are a few problems and pitfalls lurking out there that everyone using *FileMaker* should know about–and know how to overcome. And learning a few tricks can make your time with *FileMaker* even more enjoyable and productive. Here then, collected from some of *FileMaker*'s most enthusiastic users, are some of the best hints available.



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### Keep Up-to-Date

As with any software, be sure that you are using the latest version of *FileMaker Plus,* version 2.1 at press time. All users with version 2.0 should obtain the update to 2.1 from Nashoba Systems. The original *FileMaker,* version 1.0, is still available for 128K Macintoshes, which do not have enough memory to operate *FileMaker Plus* versions 2.0 or 2.1. These tips have been tested with version 2.1, but some may also apply to 1.0.

### Check the Index

*FileMaker Plus* indexes every word and number entered–a feature unique to this program. This makes the View Index item on the Edit menu particularly useful. While entering a record in Browse mode, or while conducting a Find, click any field and then choose View Index. *FileMaker* then presents a scrollable list of everything entered in that field, from every record in the database. Double-click any item on the list to paste it into the selected field of the current record or into the Find dialog box. This helps avoid typing errors that might flummox you later when you try to locate records. You can also use View Index to find misspelled words throughout the database. Scroll the list, watching for nearly identical words. If you spy one that's misspelled, paste it into a Find request to locate the record containing the error.

### Keeping It Together

View Index becomes even more useful in combination with Option-spaces. Entering the song title "Here Comes the Sun," for instance, into a *FileMaker* field using a normal space between the words results in each of the four words' being indexed separately. If you hold down the Option key while pressing the spacebar, however, the

*(continues)*

entire phrase is indexed as if it were a single word and shows up in the View Index window as a single item. This facilitates finding specific records. For the same reason, use Option-space when entering spaces in names of people or companies, as in American Can or American Computers, for example.

### Stopping a Slide

For creating a layout, the Gadgets menu has an option that slides objects to the left. This improves the printed appearance of some layouts, such as mailing labels, but it may produce unwanted results. Here are a couple of tricks to keep selected fields from sliding. Objects slide left only if they are set to Align Left on the Format menu, and only if the top of the box surrounding the field aligns vertically with the top of another field's box to its left. So, you can prevent objects from sliding left by setting them to Align Middle (or Right) or by moving them slightly up or down–just 1 pixel is enough–so they no longer line up with the field to their left. You can also prevent a text field from sliding left by expanding it on the layout to more than one text line, even if it has only one line of text entered in it.

### Watch Those Headers

Headers are very handy, and many layouts contain them. But take care when placing text and fields near the header. It's easy to wind up with material in the header that you intended to be in the body. A dashed line separates the header from the body on the layout, and any text or field that lies on or above it will go in the header–even if it's only the top line of the field's box. Move the straying text or line down 1 pixel, and back it goes into the body. If you're not sure whether something has slipped into the header, select Preview from the File menu to see how the page will print.

### Column Overload

*FileMaker Plus*'s columnar report layout allows you to select any number of fields for the layout. If the fields you select don't fit across the page, they stack up in rows, making it almost impossible to view the data in Browse mode. To spread the fields out beyond the normal page margin, temporarily define a much larger page width. If you're using an ImageWriter, set the 50% reduction option; if you're using a LaserWriter, set the reduction to as much as 25%. You can also select landscape page orientation or Computer Paper to get more room. Extending the right margin lets you see the numerous columns, but you can't print them at the original size or on the original standard paper. If you set the Page Setup back to normal, *FileMaker* shows the normal page break. You can then cut the fields that are beyond the normal page margin and paste them to one or more new blank layouts.

### Varying Column Width

When you create a new columnar report layout, the field's length depends on the length of its name. The data in the fields may need more room, however. For example, a field named Address would have room for seven characters, but addresses are usually much longer. You can temporarily rename the field, using the Define command, so it will have at least as many characters as the data you expect to enter. For example, change "Address" to "Address . . . . . ." (any character will do for the placeholders). You

*(continues)*


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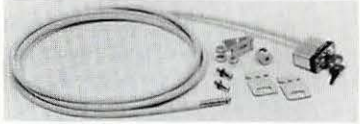

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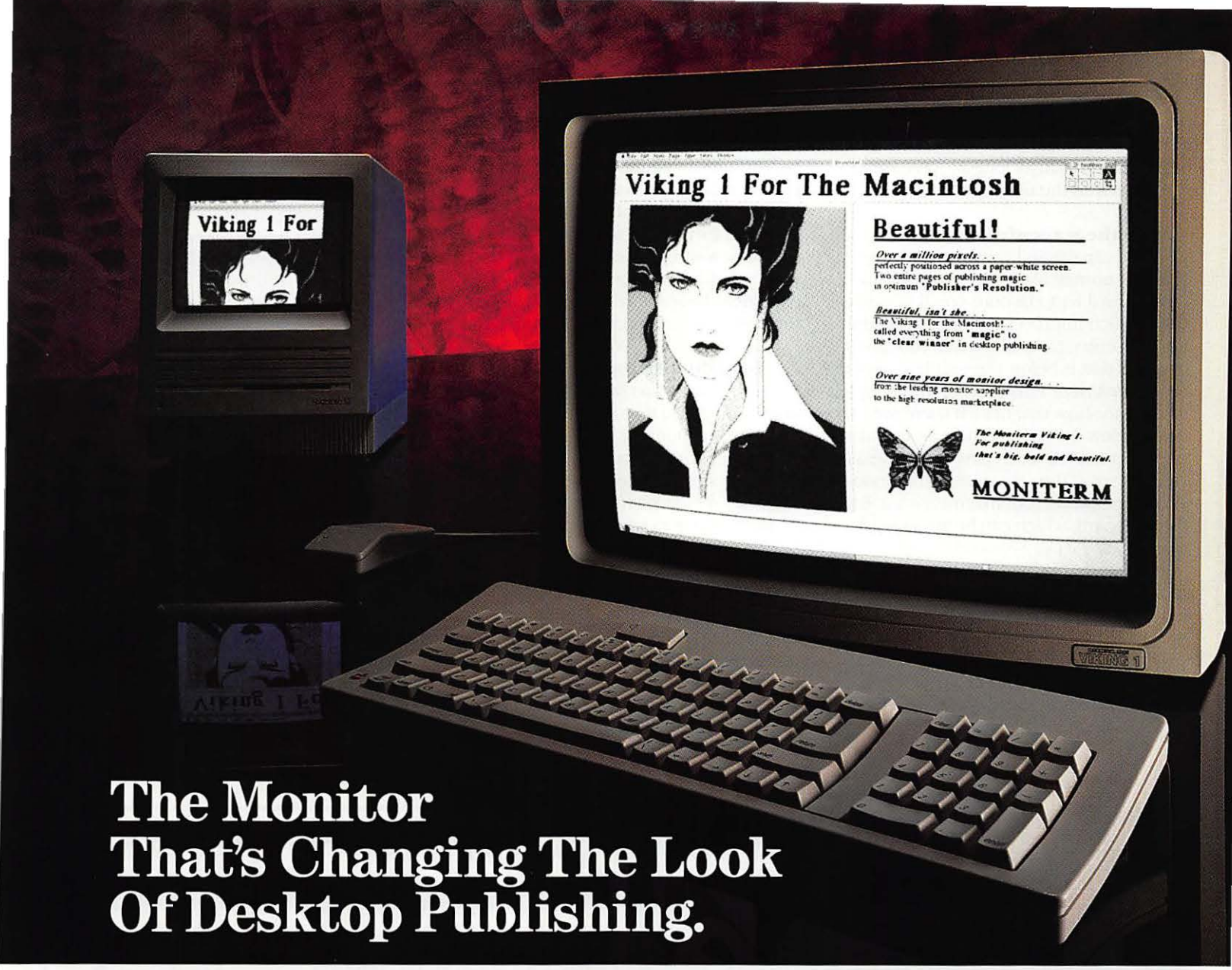


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can remove the extra characters later after the columnar layout is finished; they will disappear automatically from the field labels on the layout, as long as you haven't already edited the field label.

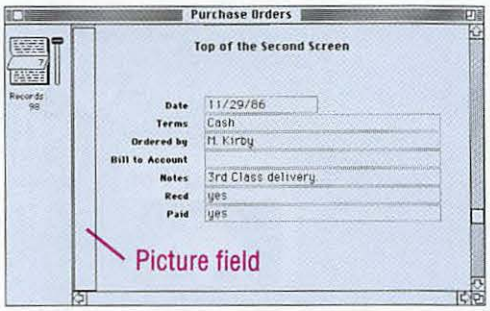
### By the Screenful

You can create layouts much larger than the normal Macintosh screen. If you tend toward large layouts, you'll like this trick, which improves tabbing action during data entry. Normally when you tab to any field that is below the visible part of the form, *FileMaker Plus* pulls up the form just enough to show that field. If there are many fields below the screen, they are revealed only as you tab to each new row of fields. You can scroll the screen using the mouse and the scroll bar, but that means leaving the keyboard, which can be annoying for fast typists.

Instead, you can force the screen to move up a full screen at a time. Define a picture field and place it on the layout at the left margin. Size this to a minimal width (about ¼ inch) and a height equal to the screen. Now, drag it down so that the field starts just past the screen when the form is scrolled all the way to the top (see "Screen Scrolling"). As you tab from the last visible field to the picture field below, the screen will be yanked up so that the entire picture field is visible, thus exposing the next full screen of the layout. One more tab carries you to the first entry field on the new screen. The beauty of using a picture field is that you can't type in it–*FileMaker* beeps at you if you try–so it's impossible to enter data in it by mistake.

### Speeding Things Up

*FileMaker Plus* has very few limitations (compared to conventional database software) on number of fields, records, or layouts, length of data in fields, and so on. But its processing speed can pose a practical limit. Very large files may bog down, taking minutes to complete some operations, such as duplicating a record with many calculations. For instance, a test file with about 480 fields, including 250 calculation fields, took about 25 minutes. Here's a much quicker method (2 minutes for the same case). Find the record to be duplicated; use the Output To command to output all fields (excluding calculation results) to a text file; then use Input From to copy data from that file back into *FileMaker*, using the Add New Records option (the default) in the Input From dialog box.




***Screen Scrolling***
*Setting up an empty picture field gives you a way to tab an entire screen into view during data entry. The picture field resides at the left margin, just past the bottom of the first screen of the layout.*

### Sorting Zips

If your file contains both 5- and 9-digit zip codes, sorting by zip codes becomes complicated. You can solve the problem with a calculation field. First, redefine the zip code field as an unformatted number

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field. Then, define a new field–let's call it ZipCalc–and specify the following calculation:

**ZipCalc = if ( Zip < 100000 , Zip * 10000 , Zip )**

If Zip is less than 100,000 (a 5-digit zip code), ZipCalc will be set to Zip multiplied by 10,000. If Zip is equal to or greater than 100,000 (a 9-digit code), ZipCalc will be set to Zip. So 92653 becomes 926530000, which will sort correctly with 92653-1234. Note that *FileMaker* ignores the hyphen in the zip code when it's doing calculations. (The clever reader may note that this method will not work with zip codes of 00009 or less, because 00009-9999 is the number 99999, which the formula would incorrectly convert to 999990000. But the lowest zip code currently in use–in Adjuntas, Puerto Rico–is 00601.) To sort all codes together, sort on ZipCalc instead of Zip, but continue to use the Zip field on mailing-label layouts. If you want to segregate the 5- and 9-digit records purposely, do a find on the Zip (not ZipCalc) for Zip < 100000 (5-digit) or Zip > 100000 (9-digit).

### The Well-Documented Database

To get a printed record of your field definitions, create a standard layout that lists all the fields in a file. In layout mode you can type in any information about the field, to the right of the field name. You'll probably want to include the field type (text, number, and so on) and, if it's a calculation, the formula. You can also note any Entry Options (Check for Unique values, Check for Existing values, Lookup, and Auto-enter options). Whenever you add a new field, select this documentation layout first, so that the new field will be automatically added to the end of the list. Note that if you have more fields than will fit on the maximum three-page layout, the field list will be cut short. Reducing the layout font size makes more space available, but you may have to add missing fields manually to the layout.

### Back It Up

*FileMaker Plus* files tend to be about twice the size of their data. That is, a file containing 100K of actual data will take up around 200K, probably more. The data index and layouts fill the extra space. If you find that a file on a hard disk is too big to copy to a floppy disk for backup–say 1200K–you can output all the data to a text file, then make a clone of the *FileMaker* file using the Clone command on the File

*(continues)*


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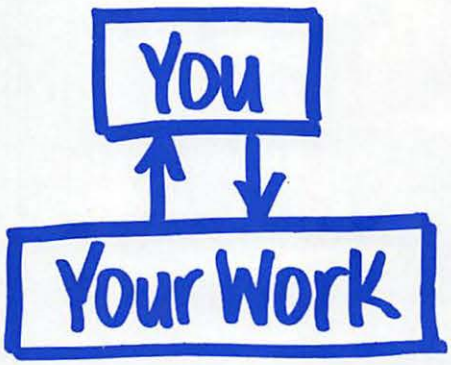


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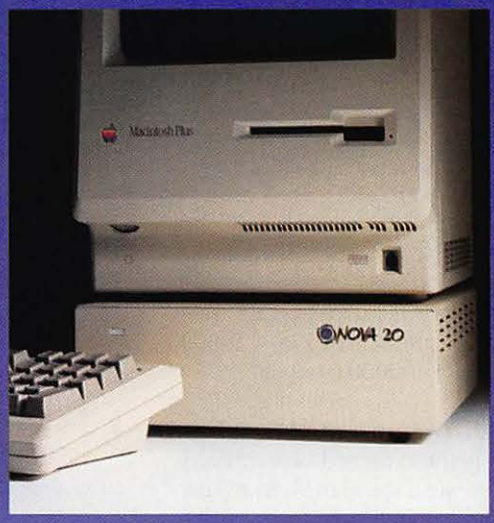

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menu. The text and clone files will probably fit on an 800K disk. Don't forget to find all the records before you do the output. When you do the output, select Move All in the Output dialog box and click Exclude to leave out calculated values. To restore from the backup, just open the clone and input from the text file.

For even larger files whose output text file may exceed 800K, select sets of records and output the data in sections to two or more text files. Of course an even better way to back up large files is to use a backup application, such as SuperMac's *DiskFit,* which automatically breaks up files so they fit on 800K disks.

### Script It

*FileMaker Plus* scripts come in handy for automating routine procedures. To record a script, first choose the layout you want, establish Page Setup, do any finding and sorting you want, and set up any Output To or Input From operations. Then choose Scripts from the File menu and give the new script a descriptive name. Once defined, a script replays all the operations you performed when it was set up. Because a script remembers Find, Sort, Output, Input, and Print specifications, it's helpful to use scripts in a file where you frequently change these specifications, as, for example, in first sorting by invoice number to print invoices and then sorting by zip code to do mailing labels.

### Reordering Scripts

If you are defining scripts for others to use, define the scripts in the order they are to be executed. Once you set up a list of scripts, any new script goes at the bottom of the list; there is no easy way to insert one in the middle. But, if you must, here's how you can do it. Basically, you rename and copy scripts to leave a dummy in midlist that you then redefine as your new script. It sounds confusing, but following the sequence in "Script Switching" may clarify the process.

Starting at the bottom of the list, perform the last script. Let it run through all of its operations (you can cancel printing after it begins, though). Change the name of the script slightly, by, for example, adding a random character to the end of the name. Now define a new script and give it the original name of the last script. You now have two scripts that do exactly the same thing. Go to the third (formerly second) script from the bottom. Change its name

*(continues)*

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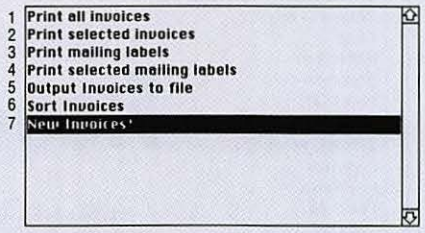
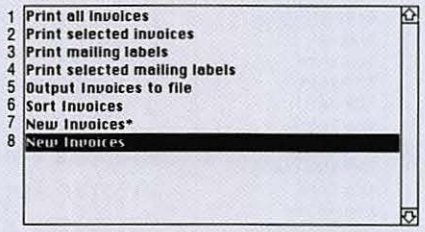
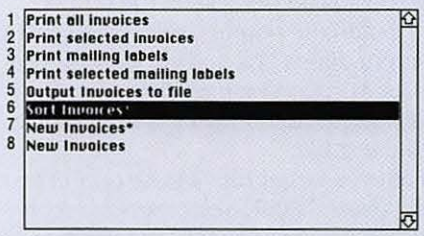
Here is the original list of seven *FileMaker* scripts. To add a script in the middle of the list, follow the process outlined here.




To begin preparing a place for the new script, perform the last script and then rename it. Here an asterisk was added.




Because you have just run the script, you can now rename it New Invoices to add a second copy at the end of the list.




Rename the sixth script Sort Invoices* and run it. Replace New Invoices* with the sorting script by changing the name New Invoices* to Sort Invoices and clicking Replace in the dialog box that appears.

Now add the new script in the position you want by redefining the extraneous Sort Invoices* script: exit the Script dialog box, perform the new script's operations, return to the Script box, rename Sort Invoices* to label the new script, and click all the Replace buttons that appear.

***Script Switching***

*There's no painless way to reorder scripts, but–for the brave–there is a method. Duplicating the scripts, changing the names, and making replacements does it, but keep track carefully: it's a lot like a shell game.*

slightly and perform it. Then select the script below it on the list, choose Change in the Script dialog box, rename it to the original name of the script above it (excluding the slight change), and click all the Replace buttons on the change dialog. You have succeeded in moving the last two Scripts down one line in the list, and you've inserted a duplicate just above them. This duplicate can now be redefined as an entirely new script, or you can repeat the substitution process until you reach the point where you want to insert a new script. To create the new script, exit the Script dialog, go through all the operations you want the new script to perform, and then go back to the Script dialog, change the duplicate script to the new name, and click all the Replace buttons.

### Reordering Layouts

Layouts, like scripts, can be added only at the end of the layout list. But they can be reordered, and new layouts inserted, by duplicating them in the right order and then deleting the originals.

For example, assume that you have four layouts, 1 = A, 2 = B, 3 = C, and 4 = D. You want to reorder these as B, A, D, and C, with a new layout added between A and D. (If you have scripts that select layouts,

*(continues)*

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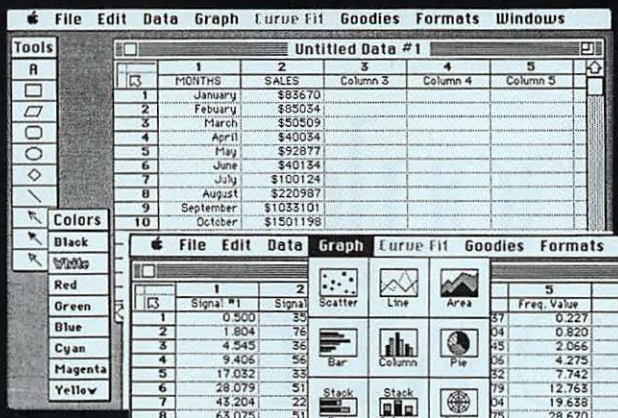


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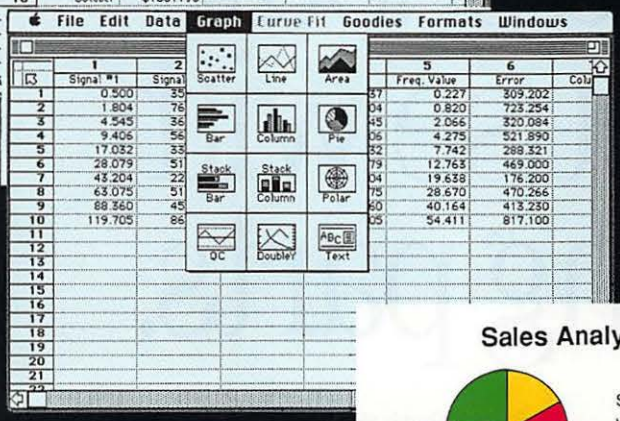


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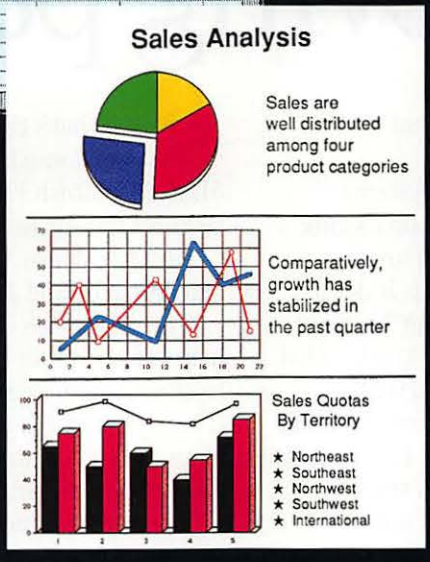


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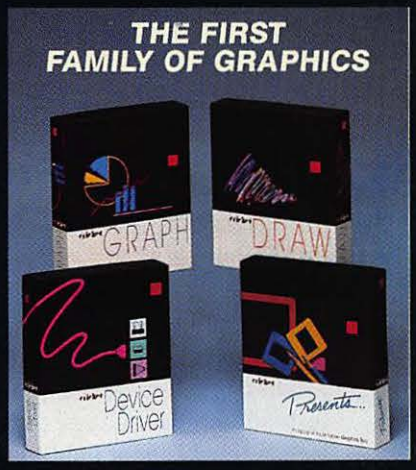


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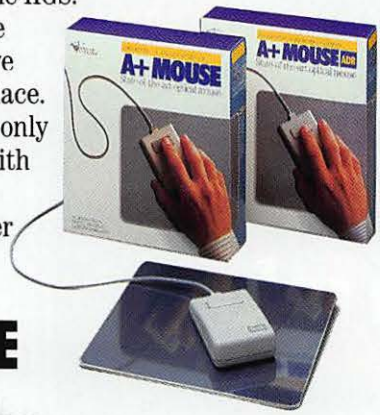


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make sure you note which layout each script selects, so you can change them after the layouts have been reordered.) Select layout B and duplicate it. The duplicate goes at the end of the layout list number 5. Select layout A (number 1) and duplicate it. Now create a new layout (just create it for now; rearrange it later). Then select layout D (number 4) and duplicate it. Select layout C (number 3) and duplicate it. You now have nine layouts in the following order: A, B, C, D, B, A, new, D, and C. Select layout 1 (A) and delete it; then delete layouts 2, 3, and 4. The layouts are now in the desired order, with the new one inserted in place. Finally, update any of the scripts that refer to the layouts.

### Delete with Care

When using the Delete Multiple command on the Edit menu, don't try to delete too many records at one time–keep it under 25. Some users have reported that deleting 30 or more records at a time can cause a system bomb. And because the file was improperly closed, *FileMaker* will have to perform repairs on it.

### Recover Often

The Recover command on the File menu not only recovers damaged database files, it also recovers disk space. Over the course of time, as records are added, deleted, and altered in an active *FileMaker* database, the file grows to take up more space than it actually needs. Recovering a database–even a healthy one–rewrites the old database into a new file, compressing its size as it goes. This procedure typically frees up 10- to 15K of disk space. In a floppy-disk system, that can be significant. A word of caution, however. When you choose Recover, *FileMaker* asks you where you want to create the new database. Make sure you choose a disk with nearly as much space as the unrecovered original. If *FileMaker* runs out of room, the recovered database will be incomplete.

### Keeping Track of Pennies

Accountants want things to balance properly–down to the penny. To make sure that your databases keep track of every penny, when you're using calculated fields, use *FileMaker*'s Round function in your equation. If you don't, your answers may be off by as much as $.03 (see "Rounding Things Out").

*(continues)*

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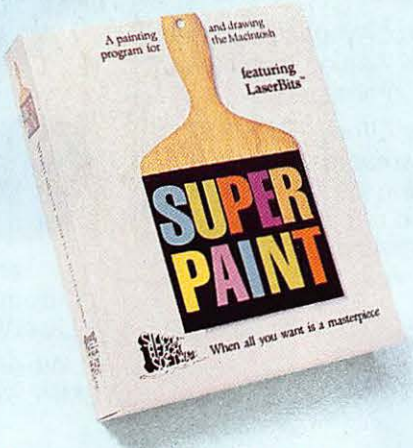


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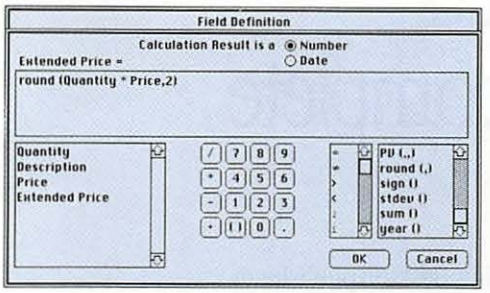



***Rounding Things Out***

*The Round function is a simple yet necessary addition to any equation involving numbers with decimals, especially those all-important numbers preceeded by a dollar sign.*

### Repeating Yourself

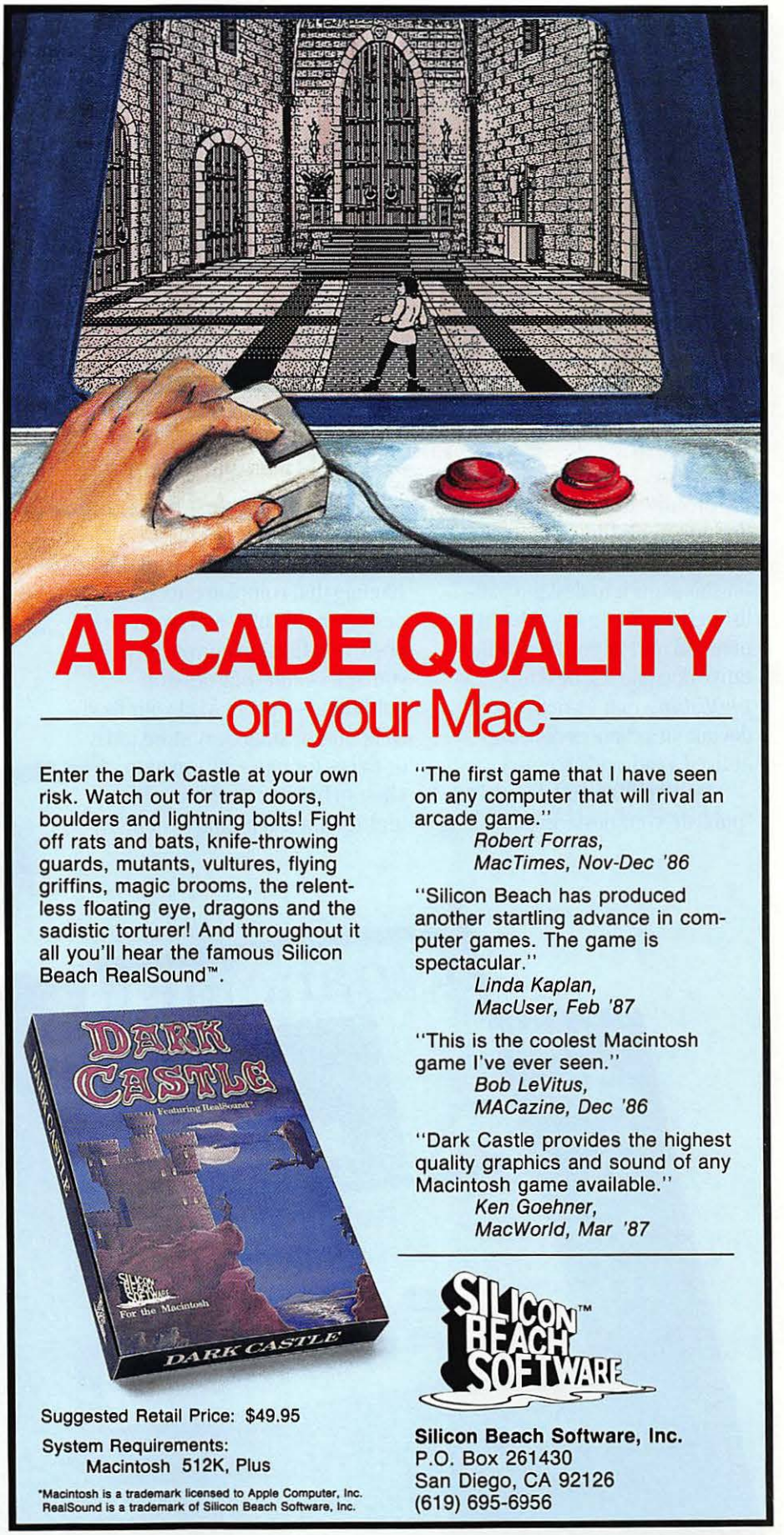
*FileMaker Plus* lets you format a field to hold more than one value. This is known as repeating fields, and it's different from simply expanding a text field to show more than one line. This feature is handy for forms involving order entry, such as purchase orders and invoices. Using repeating fields, you can set up the layout for, say, 10 or 20 rows far more quickly than you could with individual fields. Also, finding items entered in a repeating field requires only one Find request, whereas separate fields would require one Find request for each field. But you can't sort items within a repeating field, nor can you calculate totals for individual items, as you must when calculating total sales by item over several records or when doing an inventory. The conventional procedure is to keep two separate files: one, using repeating fields, for order entry, and another in which each line item from the order file is reentered as a separate record, to permit sorting and subsummary calculations. *MakeRecords,* a desk accessory from Acropolis Software, automates the transfer of data between these two kinds of files. With this DA, you output *FileMaker* data to a text file, then use *MakeRecords* to convert the data from repeating-field format to separate records. The data can then be input either to *FileMaker Plus* or to other applications, such as *Excel.*

### For More Information

For those using *FileMaker* every day, there is an excellent source of additional information: *The FileMaker Report.* It's a newsletter (ten issues per year) of news, articles, tips, and hints.

*Macworld* is interested in receiving more *FileMaker Plus* tips from readers. Send them to *Quick Tips, Macworld,* 501 Second St., San Francisco, CA 94107. □

See *Where to Buy* for product details.

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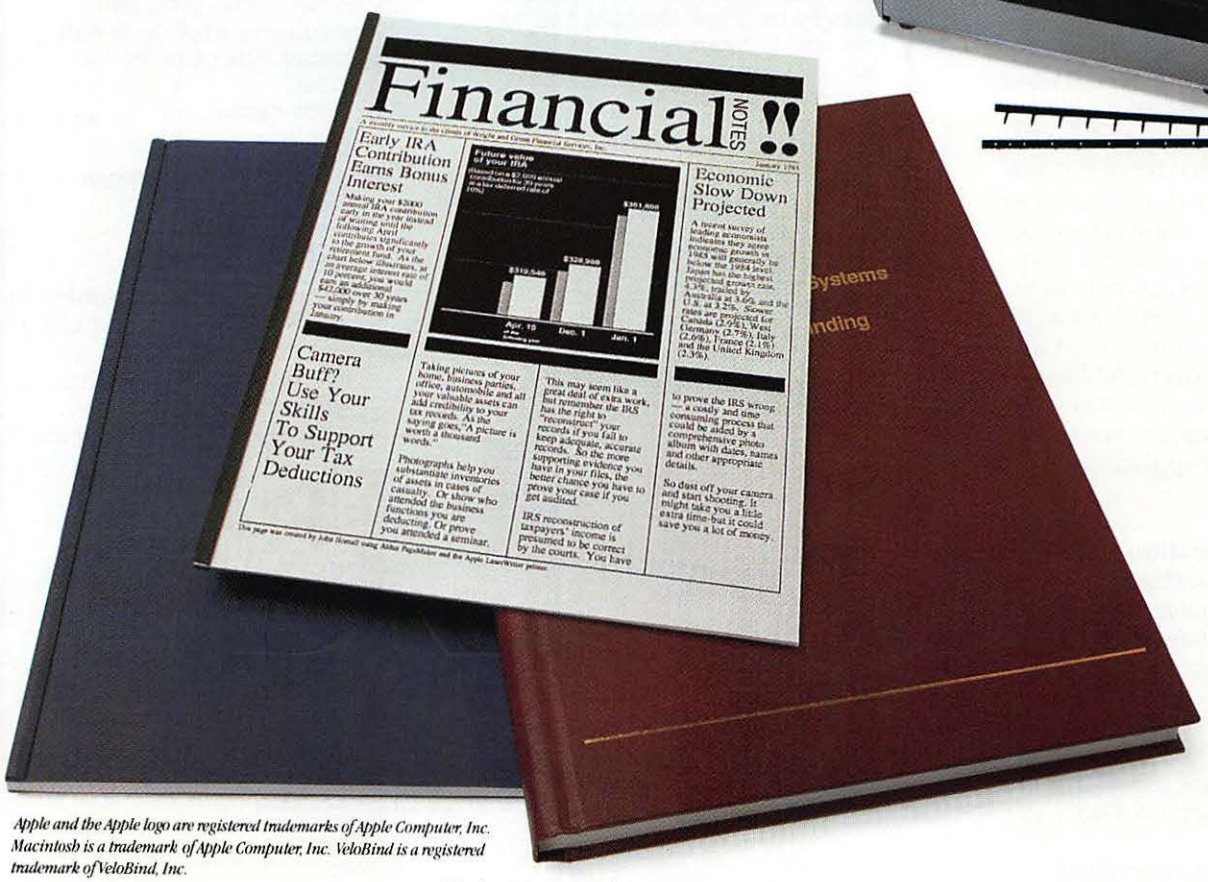


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**Circle 27 on reader service card**

# Mac Business Tools

## *Designing forms is a snap with the right tools and a little know-how*

**by Jim Morton**

Imagine the worst. You've just received the company's monthly sales figures. It's your job to check the catalog numbers on the invoices against available inventory. That's when you realize these invoices have no catalog numbers written on them. Frantically, you call the dispatch department to find out what happened.

"Catalog numbers? Nobody told me about catalog numbers," claims Roy, the new dispatcher. "There's no place on the form for catalog numbers."

He's right. In the past, Irma, the original dispatcher, automatically wrote down the numbers. When she left, her only instructions to Roy were, "Make sure that you fill out all the columns. They get mad if you don't."

The next day your department head assigns you the task of redoing the form. A few calls to graphic designers make clear that the budget for a new form will cover either the printing bill or the design bill, but not both. Frustrated, you sit at your desk and try to decide what to do next.

If this sounds familiar–or if you're thinking about having forms made for the first time–you need look no further than your Mac. Several programs offer the tools needed for designing professional-looking forms. Forms design on the Macintosh is one way for companies on a budget to save money. It's also a good way for people doing free-lance desktop publishing to broaden their client base.

Before electronic publishing, designing a form was hard work. Lines had to be carefully drawn with temperamental drawing pens. Tiny scraps of typeset text were pasted down with wax. If you were lucky, the wax held and the form made it to the printer in one piece. Changes made after a form was drafted were, at best, unpleasant –at worst, impossible.

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Today, anyone who can move a mouse can draw a straight line. Tiny bits of text and smearable ink lines are things of the past. Massive changes to a form can be made with little difficulty.

Forms can be anything from inspection checklists to retail sales slips to income tax returns. A well-designed form speeds up job processing, eliminates duplicated effort, and reduces errors. Badly designed forms can turn your company into a miniature of the federal bureacracy. The problem is, there are precious few rules for designing forms.

### Design Programs Grow Up

Ironically, in spite of the powerful graphics capabilities of the Mac, full-featured forms-design programs have become available only recently. Some valiant users in the early days attempted to create forms with *MacPaint*–usually with results more interesting than useful. The introduction of *MacDraw* and the LaserWriter improved things considerably, but QuickDraw's inability to create lines thinner than 1 point constrained Mac forms design until the introduction of *PageMaker* 1.2.

However, *PageMaker* 1.2 was still limited. You could draw a hairline and a 1-point line, but nothing in between. Most forms use line weights between ⅓ and ⅛ point. PostScript and the LaserWriter certainly could create lines within this range, but until *Cricket Draw* arrived in early 1987 no program took advantage of the capability.

Unlike *MacDraw, Cricket Draw* can create the thinnest line a Linotronic 300 can print–and bolder lines in any increment. *Cricket Draw* also adds many features previously available only in page-

*(continues)*

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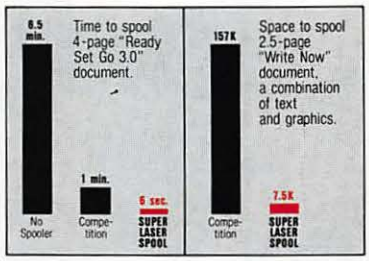


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layout programs, including adjustable rulers, guidelines, and the ability to use more than one face, style, and size in a text box.

*PageMaker* 2.0 adds a ½-point rule to existing point sizes. The latest version lets you adjust the size of the text box down to ½ inch, which helps when working with small pieces of text in forms.

In drawing programs and page-layout programs, many of the basic techniques for creating forms are the same. I chose *Cricket Draw* to demonstrate designing a form with a drawing program, and *PageMaker* for the page-layout example.

Forms design is by no means limited to these two programs. I have successfully designed forms with several other programs, including *LaserPaint, Adobe Illustrator, MacDraw, ReadySetGo* version 3, *Scoop,* and *Quark XPress.* Each program has particular advantages and disadvantages, which I'll get into later. There are also new specialized forms packages for the Mac (see "The Paperless Form").

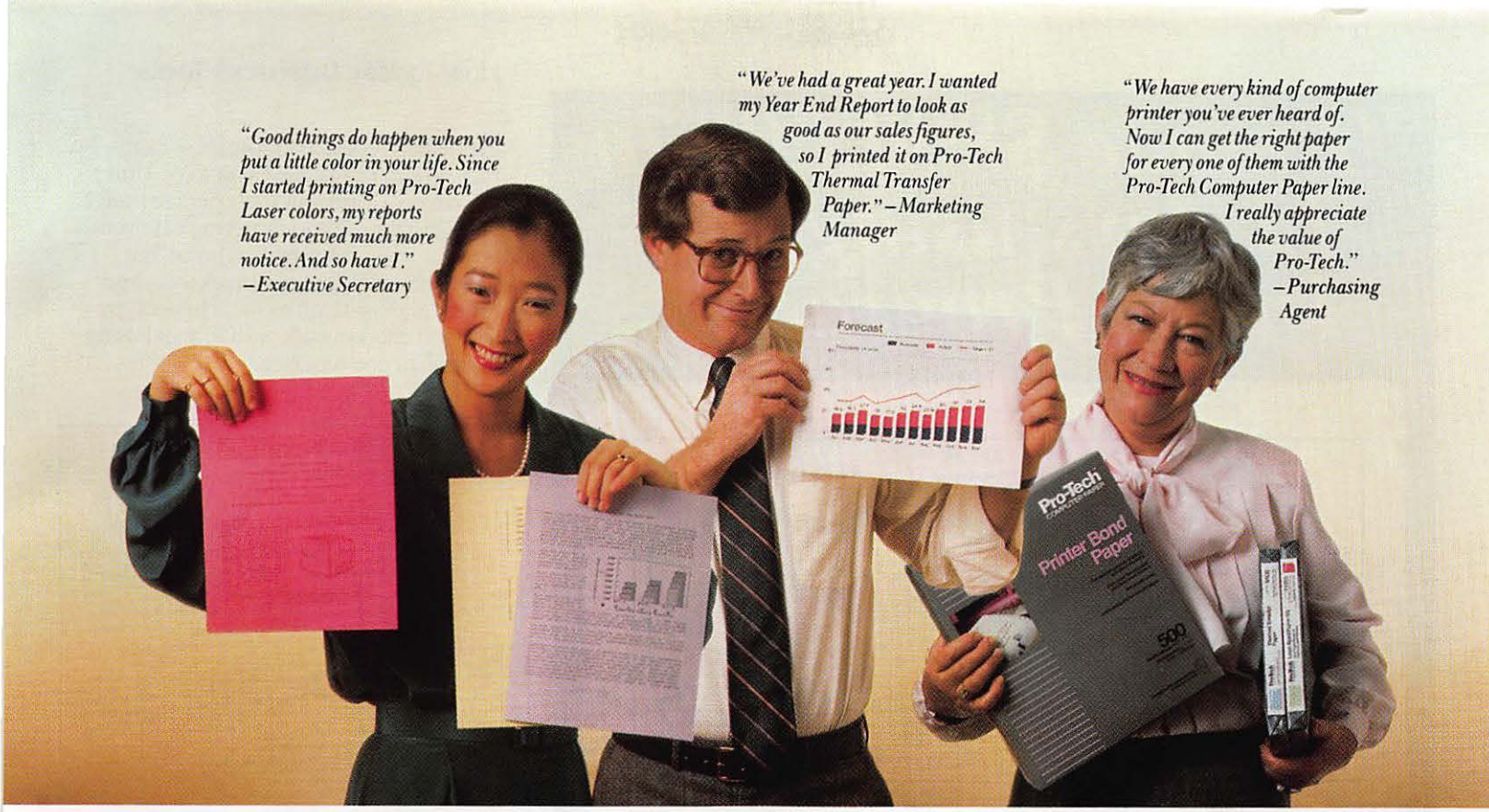
### Getting Started

To give you a better idea of the process that goes into designing a form, I'll walk you through creating an invoice for a company that sells that great old staple of Economics 101: the widget. The company is American Widgets, Incorporated. The sales manager has given you a typewritten mock-up of what he wants (see "A Starting Place"). It's your job to turn that mock-up into a professional-looking form.

The first step in designing a form is to find out what the boss–or if you're a freelance desktop publisher, the customer–wants. It's the hardest part of designing any form. The main rule to follow: don't leave *any* questions unanswered. No matter how repetitive it may seem, go over the placement of *everything* on a page. You'd be amazed how many interpretations an instruction can have. Something that seems perfectly clear to the person who sketched the mock-up may make no sense at all to you.

In this case, we discover that the boss wants all the underlined type to appear in bold. When you ask about typeface preferences, the response is "something businesslike." Invariably, that means Helvetica,

*(continues)*

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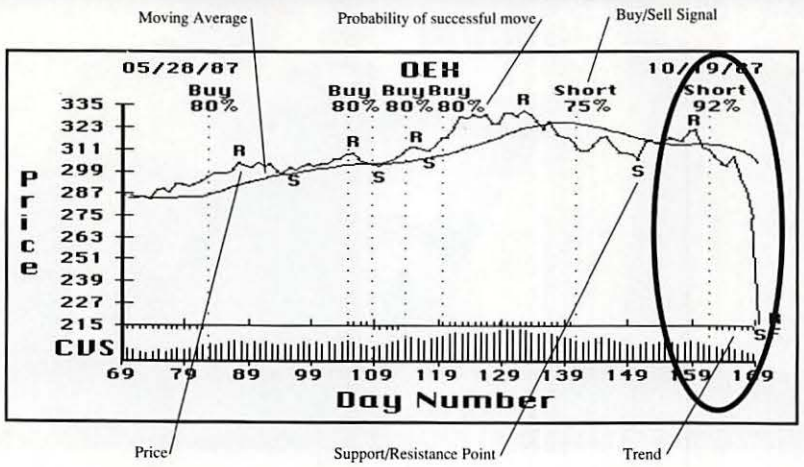


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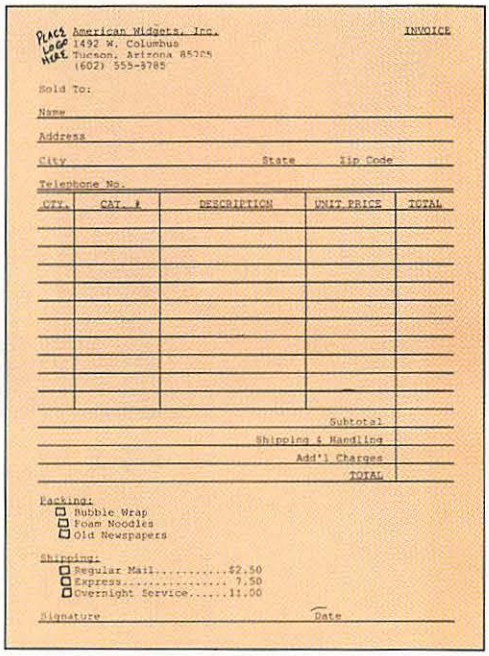
the default typeface for business forms. No rule says you can't use Palatino or Times Roman on a form, but most people prefer sans serif type (block lettering). Helvetica is by far the most popular choice, but I have seen excellent examples that used Avant Garde and Micro. Whichever typeface you choose, stick with it; avoid using more than one typeface.



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***A Starting Place***

*The original you work from may be typewritten, drawn, or pasted together from pieces of several different forms.*

Although the boss typed this draft on an 8½-by-11-inch sheet, the final form should be 5½ by 8½ inches. This may crowd things, but later you'll see ways to relieve the problem. The accounting department wants the form printed to make four carbonless copies, each one a different color. And the company name should appear in red at the bottom of each page, along with the four copy labels: Original (white paper), Customer (canary paper), Dispatch (pink paper), Duplicate (goldenrod paper). The company logo goes in the upper-left corner–also in red.

With that cleared up, now you're ready to begin.

*(continues)*

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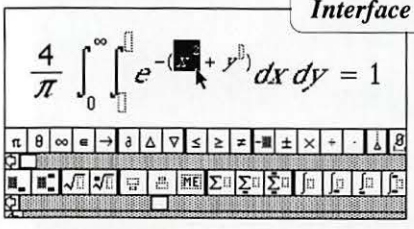

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# The Paperless Form

Long a dream of technocrats and tree lovers everywhere, the paperless office is no closer today than it was 20 years ago. Our society seems to exist for paperwork. If anything, the problem gets worse every year.

The first step to a truly paperless office is the paperless form. A few intrepid companies did release products that attempted to bring us closer to a completely electronic working environment. Unfortunately, early attempts were worse than the red tape they were supposed to eliminate. Remember *MegaForms?*

Macintosh users, because of the visual nature of the Mac, have been pioneers in interactive forms design. Several programs currently available let you fill out forms on the screen instead of on the table.

One program for interactive forms design is *Ragtime.* Like *PageMaker* and *Scoop, Ragtime* is a full-featured page-layout program, but with a difference: you can assign spreadsheet cells to specific areas on each page. The cells have most of the features found in a typical spreadsheet. You can enter and format numbers and assign formulas to individual cells.

As you might expect, for interactive forms like customer sales and payment files, you'll need a database manager. *FileMaker Plus* lets you create full-page interactive forms within the program. You can then place data fields anywhere on the page. Acius's *4th Dimension* features a tool palette that rivals *MacDraw*'s. It also imports PICT forms designed in *MacDraw* via the Clipboard.

Besides *Ragtime* and the database programs, there are also programs specifically designed for creating forms. *Fast Forms Construction Kit* from New Directions Software lets you design interactive forms; you can print them out entirely, or you can print only the cell information onto existing paper forms. *TrueForm* from Spectrum offers similar features but takes a slightly different approach. With *TrueForm,* you scan an existing form and use that form on screen. If you don't have a scanner, *TrueForm* also accepts forms created with various graphics programs, or Spectrum will scan your forms for you.

### Using Cricket Draw

The obvious choice for designing forms is a drawing program. Most forms are, after all, little more than lines and boxes. *Cricket Draw* has the best features for this kind of work, and it is easier to use than the other programs.

Before you start, go to *Cricket Draw*'s drawing window and make sure that the rulers and guides are turned on. Go to the upper-left corner of the window where the rulers intersect. Click and drag the rulers down and to the right approximately ¾ inch. This creates the upper-right corner of your form. Click anywhere on the vertical ruler and drag a guide over to the new zero point, and another to the 5½-inch mark. Click anywhere on the horizontal ruler and drag two more guides down to the 0- and 8½-inch marks. These guides mark the four edges of your final form.

*(continues)*

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Then define the image area on the form: 4¾ by 7¾ inches. Drag two more horizontal guides to the ⅜-inch and the 8⅛-inch marks. Drag two vertical guides to the ⅜-inch and the 5⅛-inch marks. After these margin guides are in place, set the line width to ⅗ point or less, and draw the corner trim marks.

Now you can start placing images on the page. How you organize things from here is largely a matter of personal preference. I like to place all header information, except the logo, on the page and then set guides for the product information section of the form. This gives me a better idea of how much room I have and what I can do with it.

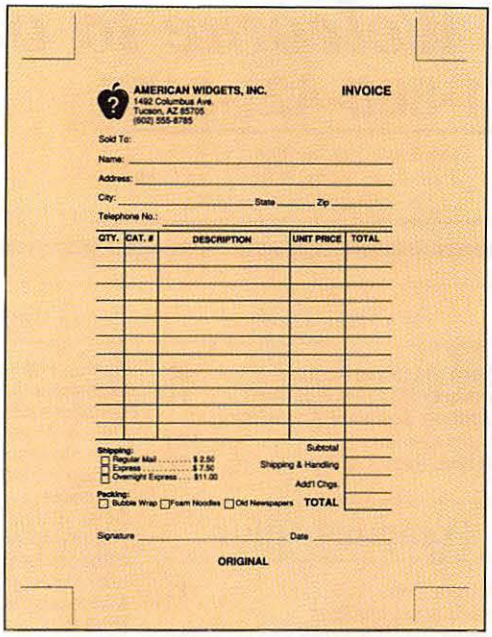
Because the sales manager's rough draft was not designed with the final shape of the form in mind, you'll have to move things around to make everything fit comfortably. The lines that extend across the page after the Subtotal column waste space, so eliminate them and move the Packing and Shipping information into that area. To save even more space, change the Packing checklist from a column to a row.

The best program for drawing the logo is *Adobe Illustrator.* Unfortunately, *Cricket Draw* cannot import EPS files, so you must create the logo within *Cricket Draw* using smoothed and edited polygons. (Since it is not important to the overall design of the form, I won't detail the process of creating the logo here.)

To distinguish the four copies, center the word *Original* in 12-point bold type at the bottom of the page and save the file as Form #1. Then change the word *Original* to *Customer* and save the file as Form #2. Continue this procedure for all four versions (see "The Cricket Draw Approach").

Although the logo and the copy label at the bottom of the sheet are going to appear in a different color, put them on the same page. Let the print shop handle the color separations.

You can also create forms with CAD/CAM programs, but I don't recommend it. Designing forms with such sophisticated software is like going duck hunting with a Sherman tank. The best alternative to a drawing program is a page-layout program.




***The Cricket Draw Approach***

*The finished form in* Cricket Draw *should look like this, bracketed by trim marks. To get an on-screen preview of the form's final appearance, turn off the guides.*

*(continues)*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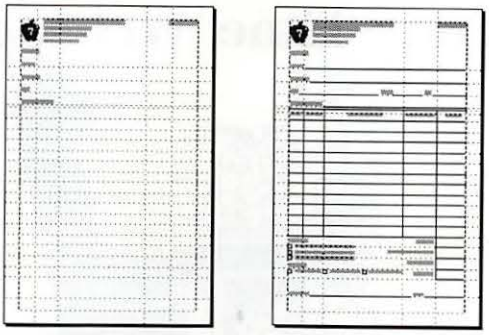
### Using PageMaker 2.0

When designing forms, the most important feature to look for in a page-layout program is the ability to create a ½-point line. Currently, only *Scoop* and *PageMaker* offer this size. With *Scoop,* the ½-point rule becomes even more important if you print your files on a Linotronic. In most page-layout programs, the hairline is set at a standard ¼ point. With *Scoop,* it is created from a single row of dots in the smallest increment available on the device being used. A hairline on a laser printer is 1/300 inch, which happens to be almost exactly ¼ point. The same hairline printed on a Linotronic 300 comes out to 1/2540 inch—much too thin for legibility on a form.

To start, open *PageMaker* and select New from the File menu. Set the number of pages at four, and the margins at ⅜ inch for all four sides. Set the page size at 5½ by 8½ inches to see the form exactly at its finished size. (When you print the form, select Crop Marks in the Print dialog box; *PageMaker* automatically centers the form on an 8½-by-11-inch sheet and provides trim marks.

Page-layout programs have a slight edge over drawing programs in creating forms. With *Cricket Draw,* the four different copies of the form were created by saving the form under four different names, changing only the line at the bottom. In *PageMaker,* you can avoid this hassle by creating most of the form on a master page. Then you can print out masters for all four copies with just one print command.

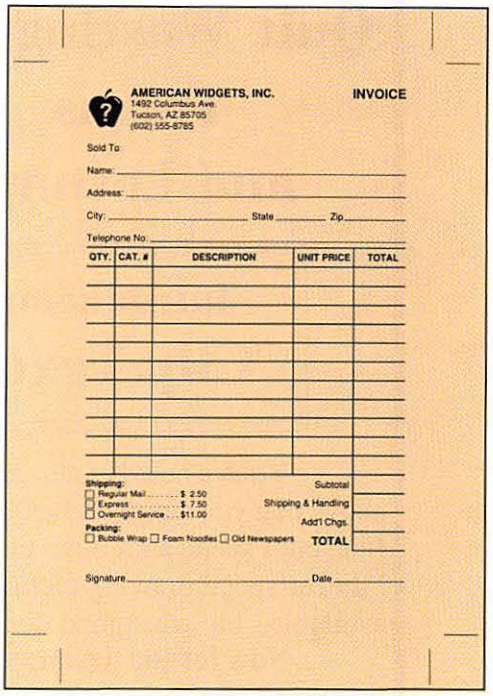


***Forms by PageMaker***

*Begin creating a form in* PageMaker *by placing the page headings. Mark the columns and rows with guides; then draw the rules in the Fit in Window view. The finished form includes the logo created in* Illustrator.

Basically you follow the same procedures as with *Cricket Draw,* except you don't have to set guides for the sheet size and inside margins; *PageMaker* does that for you. After the guides and basic type are

*(continues)*





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in place, lock the guides and start drawing rules (see "Forms by PageMaker").

*PageMaker* doesn't have the tools necessary to create logos. For that, either use *Adobe Illustrator* or scan an existing copy of the logo and place it as a TIFF (tagged-image file format) object in the document.

### Tips and Techniques

An extremely handy feature found in *Quark XPress* and *ReadySetGo* version 4 is the ability to duplicate lines in any direction as many times as you want. The American Widgets invoice, for example, has 13 lines of the same length spaced 9/32 inch apart. In *PageMaker,* you must set up the guidelines and draw each line. With *XPress* you draw the first line and then, with the line still selected, open the Step and Repeat dialog box (in *ReadySetGo* version 4, choose Duplicate from the Edit menu). Enter the number of lines you want and how far apart they should be; the program does the rest.

Sometimes a form has text running horizontally and vertically. *PageMaker* and most other page-layout programs do not let you place text vertically. To get around this problem, create vertical text in a drawing program and save it as either a PICT or an EPS file. Then place the vertical text as an object.

A common design element on forms is a screened area–often labeled "For Office Use Only"–where you don't want people to write. Although most page-layout programs let you screen areas, it isn't always a good idea. Unless you are printing your forms directly to negative on a Linotronic, it's best to let the printer screen the area for you. The printer makes a separate overlay for the screen and burns it directly onto the printing plate. This not only makes a better-looking screen, it also avoids the problem of plugged-up letters that occur when a negative is shot from a screened image.

### Getting Help

The best way to learn forms design is by example. If you're fresh out of ideas, there are places you can turn. The business reference section of any large bookstore is the first place to look. There, you will find books full of nothing but forms. These books are intended for small businesses that can't afford to design their own forms.

Another good place to look for ideas is the competition. How do they handle the same problems? Is there something you overlooked?

For readers who need retail invoices, I have uploaded three sample retail forms into the Aldus forum on CompuServe. They are in the *PageMaker* Templates data library, under the name PVINV2.PIT.

### At the Printer

As with anything you print, the more closely you work with the printer the happier you both will be. A few rules always apply. Be sure to leave at least ¼ inch of space at either the top or bottom of the page. If the forms are going to be punched, make sure that the holes don't punch into the image area. If the forms must be numbered, be sure to leave a space for the numbers (an obvious but often overlooked point).

If there are color separations (as in the example) or you want certain areas screened, indicate it on a tissue overlay, and discuss your instructions to make sure that the printer understands what you want. If parts of a form appear in a second color, there is no need to put these elements on a second overlay unless they overlap the first color. The first color on a form is usually black.

*(continues)*


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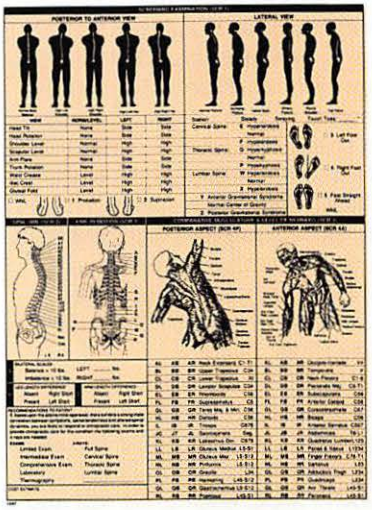
# Blue-Ribbon Form

Certified forms consultant Lisa R. Burton no longer makes sketch after sketch when designing complicated forms for clients in her Ventura, California, business. "Formerly, I'd have to draw a form on paper, and then there would be interpretation problems between me and the client, so I'd have to redraw–and then there would be interpretation problems between me and the typesetter," says Burton.

The complicated yet clear chiropractic example reprinted here recently won Aldus's award for forms design. It's just one page of an eight-page form that Burton designed to correspond to her client's computerized office system. Using



*PageMaker* 1.2 and images scanned with a Microtek 300A, she finished the job in only two drafts.–*Nancy E. Dunn*

If you want a set of carbonless copies in a series of colors (as in the American Widgets invoice), find out whether the printer can get precollated sheets for the color sequence you want. Presorted carbonless paper comes in reverse order of the most popular color sequences–since the press feeds in the last sheet first, they come out of the press in the right order. Precollated paper costs a little more than uncollated sheets, but the elimination of press setups and collating charges usually makes up the difference.

There is no "best" software for creating forms. *PageMaker* is the fastest to work with, but it lacks the step-and-repeat feature of *Quark XPress* and *ReadySetGo* 4. None of the page-layout programs offers the line-width control that you get with drawing programs. Which program is best for your needs depends on which features you'll use and which you already have.

The American Widgets invoice is a simple example of a form. There are plenty of other examples out there to learn from–including the award-winning design in "Blue-Ribbon Form." □

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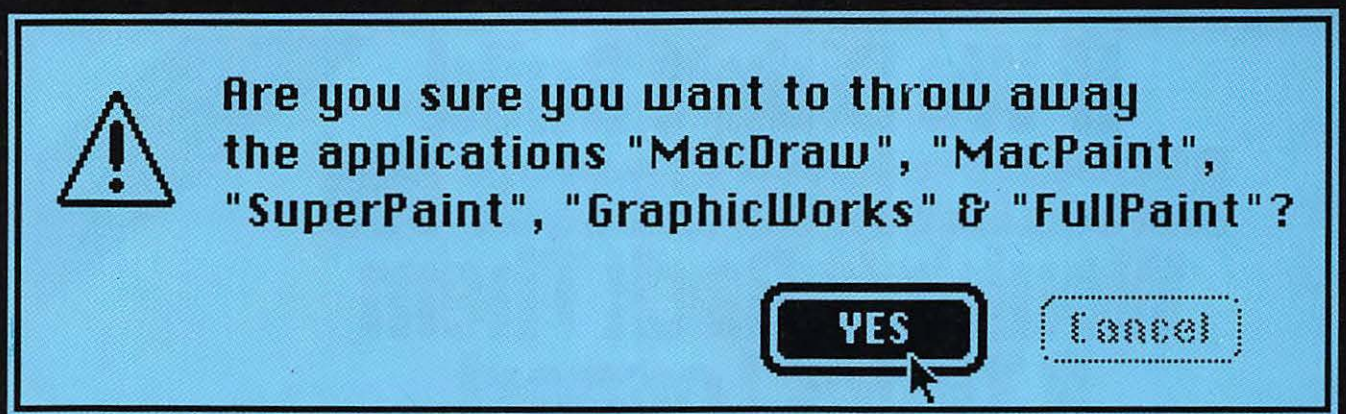


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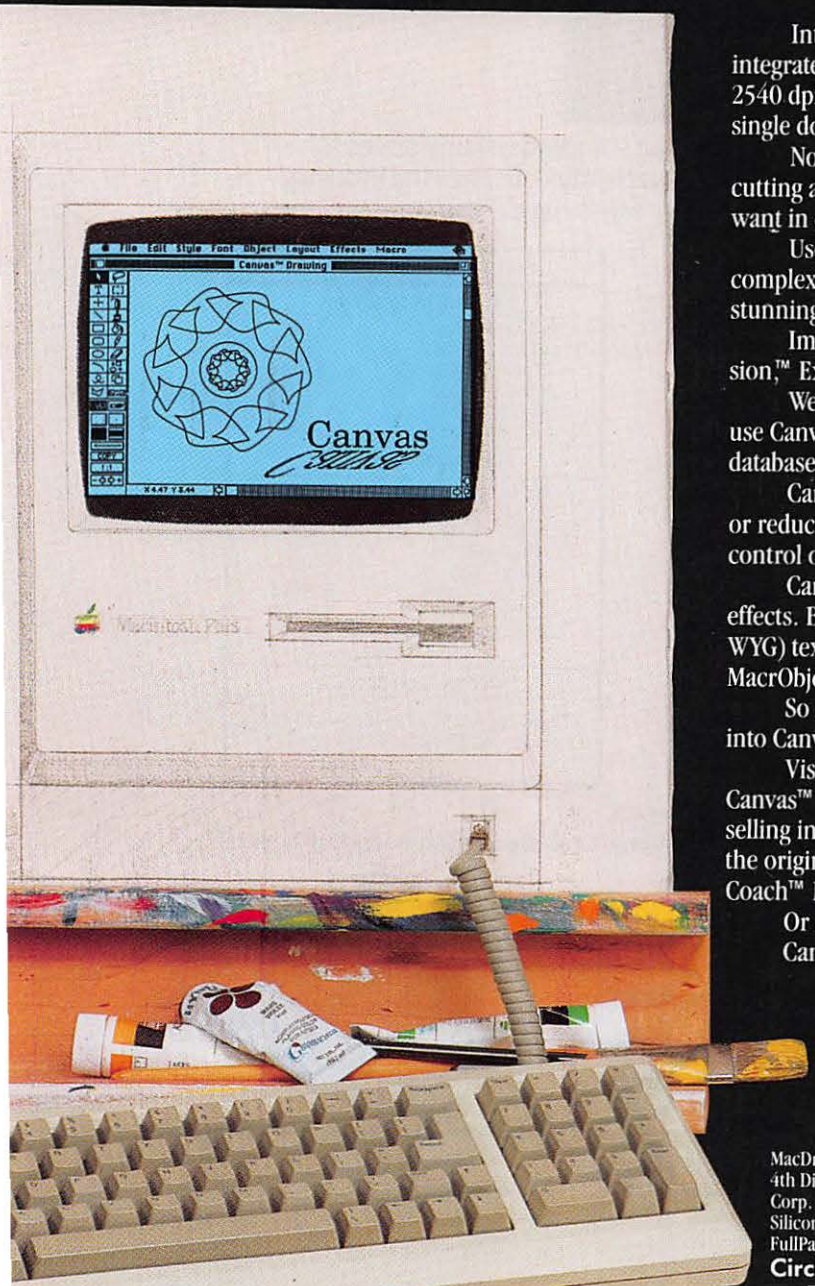


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# Updates

*This list brings you the highlights of software updates recently received but not yet tested. The first price is the upgrade cost for registered owners; the second is the current list price.*

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**1st Aid HFS** adds file and disk recovery for HFS disks, including hard disks. 1st Aid Software, 42 Radnor Rd., Boston, MA 02135, 617/847-4190. $25; $99.95 new.

**Graham Speller** version 1.1 runs faster when using the thesaurus. It is fully compatible with *MacDraw, Excel, Multiplan,* and *More.* Graham Software Co., 8609 Ingalls Circle, Arvada, CO 80003, 303/422-0757. Free; $44.95 new.

**inTalk** 3.0 supports the Mac II. Includes a script language for building Mac interfaces with mainframe software and enchances window handling for faster drawing speed and use of larger screens. Also features the ability to paste graphics and other data to a remote Mac Clipboard. Palantir, 12777 Jones Rd. #100, Houston, TX 77070, 713/955-8880. Free if purchased after Aug. 1, 1987; $50 with return of first page of the manual if purchased earlier; $195 new.

**LaserServer ROM** version 1.1 improves network performance of the LaserServer. It stores up to 30 different Prep files, notifies the user at the beginning and end of print jobs, and can display the size of each job. DataSpace Corp., 185 Riviera Dr., Unit 9, Markham, Ontario, Canada L3R 5J6, 416/474-0113. Free; LaserServer $2095 U.S. new.

**MacAtlas Professional Version** features more than 60 maps of world regions, including major cities, countries, and water bodies; PICT

*(continues)*

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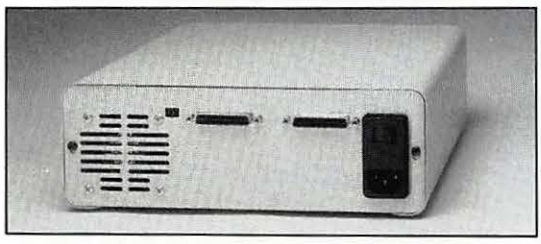

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format. MicroMaps, P.O. Box 757, Lambertville, NJ 08530, 609/397-1611, 800/334-4291. $120; $199 new.

**MacDraft** version 1.2b is fully compatible with the Mac II. Innovative Data Design, 2280 Bates Ave., Ste. A, Concord, CA 94520, 415/680-6818. Free if purchased after July 1, 1987; $25 if purchased earlier; $269 new.

**MacPlot** version 3.2 is a true driver that lets you plot directly from within applications. Lets you specify multiple line widths and fill patterns. Text sizing and positioning are more precise in draft-text mode, and Scale and Plot positioning are now controlled from the Page Setup window. CompServCo, 800 Freedom Ln., Slidell, LA 70458, 504/649-0484. $50; Standard package $199 new, professional package $399 new.

**ReadySetGo** 4.0 lets you define the distance between text and graphic image. It has a more accessible tool bar, new design grids, and lets you control hyphenation. Includes interactive facing pages and supports gray levels in TIFF and EPS. Also includes style sheets and a search-and-replace function based on word, font, style, or size. Allows global text linking. Has a 100,000-word spelling checker and glossaries. LetraSet USA, 40 Eisenhower Dr., Paramus, NJ 07653, 201/845-6100. $75 plus $10 shipping and handling; $495 new.

**Smartcom II** version 3.0 is compatible with MultiFinder and allows users to move and resize its windows. Supports Hayes 9600 V-Series and the Mac's high-speed ports. Hayes Microcomputer Products, P.O. Box 105203, Atlanta, GA 30348, 404/449-8791. $25; free if purchased within last 90 days; $149 new.

**Smash Hit Racquetball Two-Player Version** lets you compete against your opponent via AppleTalk, modem, and serial cable. Also works in single-player mode. Includes new digitized sounds and allows custom SoundCap/SoundWave files. Copy protection has been removed. Primera Software, 650 Cragmont Ave., Berkeley, CA 94708, 415/525-3000. $20 with return of original disk; $39.95 new.

**TopDesk** print spooler version 2.4 fixes bugs that appeared when previous versions were used with *Microsoft Word* 3.01. Cortland Computer, P.O. Box 9916, Berkeley, CA 94709, 415/845-1142. Upgrades from version 2.0 to 2.3 free with return of disk, upgrades from previous versions $10 with return of original disk; $59.95 new.

**WorksPlus Spell** 1.1 runs about five times faster than 1.0. ⌘-key short cuts for alternatives dialog, and Add and Ignore buttons have been added to the Spelling Alternative dialog box. A spelling preferences dialog box has been added, and the glossary now includes Returns. Allows multiple hyphens and minor additions/cleanup of the dictionary. Includes word count, and improves the 512K out-of-memory limit problem. Lundeen & Associates, P.O. Box 30083, Oakland, CA 94604, 415/893-7587. Free if purchased after July 1, 1987, $15 if purchased earlier; $79.95 new. □

*To have products listed in this section, send upgraded software, an outline of major changes since the previous release, upgrade price, suggested retail price, company name, mailing address, and phone number to* Updates, Macworld, *501 Second St., San Francisco, CA 94107.*


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**Statistics:** Basic statistics, frequencies, t-tests, post-hoc tests Multi-way crosstabs with log-linear modeling, association coefficients, PRE statistics, asymptotic standard errors Nonparametric statistics (sign, Runs, Wilcoxon, Kruskal-Wallis, Friedman two-way ANOVA, Mann-Whitney U, Kolmogorov-Smirnov, Lilliefors, Kendall coefficient of concordance) Pairwise/listwise missing value correlation, SSCP, covariance, Spearman, Gamma, Kendall Tau, Euclidean distances Linear, polynomial multiple, stepwise, weighted regression with extended diagnostics Multivariate general linear model includes multi-way ANOVA, ANOCOVA, MANOVA, repeated measures, canonical correlation Principal components, rotations, scores Multidimensional scaling Multiple and canonical discriminant analysis, Bayesian classification Cluster analysis (hierarchical, single, average, complete median, centroid linkage, k-means, cases, variables) Time series (smoothing, seasonal and nonseasonal ARIMA, ACF, PACF, CCF, transformations, Fourier anaylsis) Nonlinear estimation (nonlinear regression, maximum likelihood estimation, and more)

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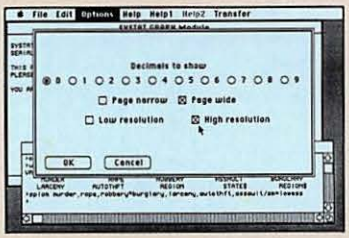
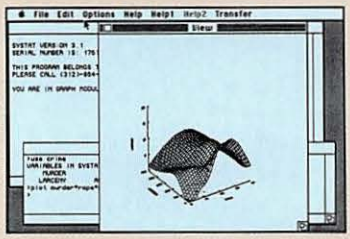
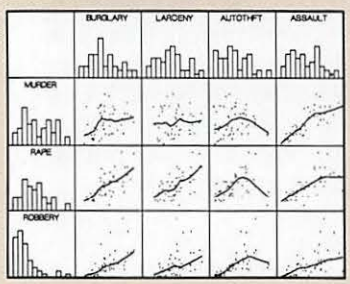
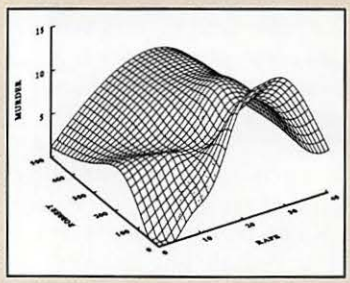
**Mac screens**





**LaserWriter™ graphics**

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# Where to Buy

*This section contains information about products mentioned in this issue. Programs are not copy protected unless otherwise indicated. All prices are list prices. An asterisk indicates that a product review appears in this issue.*

*Public domain software and shareware are available through online information services; user groups (call 800/538-9696 ext. 500 for information on a local user group); or mail-order clearinghouses such as Educomp, 742 Genevieve, Ste. D, Solana Beach, CA 92075, 619/259-0255, 800/843-9497, 800/654-5181 in California, or The Public Domain Exchange, 2074-C Walsh Ave., Dept. 609, Santa Clara, CA 95050, 408/496-0624, 800/331-8125.*

## *Pages 136 to 147*
*New Life for an Old Mac*

*For individual products and prices, see "Accelerator Boards," "Memory," and "SCSI Ports" tables.*

Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014, 408/996-1010.

CDC Enterprises, 2883 E. LaPalma, Anaheim, CA 92806, 714/630-4633.

Data Memory Systems, P.O. Box 785, Middleton, MA 01949, 617/683-2325.

Dove Computer Corp., 1200 N. 23rd St., Wilmington, NC 28405, 919/763-7918, 800/622-7627.

Ehman Engineering, 115 Apache Dr., Evanston, WY 82930, 307/789-3830, 800/257-1666.

General Computer Corp., 580 Winter St., Waltham, MA 02154, 617/890-0880, 800/634-9737, 800/854-9737 in Illinois.

Hard & Soft, Inc., 2005 W. Cypress Creek Rd. #1A, Fort Lauderdale, FL 33309, 305/772-0430.

Levco, 6160 Lusk Blvd. #C-203, San Diego, CA 92121, 619/457-2011.

MacAdvance, P.O. Box 186, Chanhassen, MN 55317, 815/229-5023.

MacDoctor Electronics, 1145 Terra Bella Ave., Mountain View, CA 94043, 415/964-2131.

MacMemory, Inc., 2480 N. First St., San Jose, CA 95131, 408/922-0140, 800/862-2636.

MacPeak Systems, 1201 Spyglass, Austin, TX 78746, 512/327-3211, 800/225-7509.

MacProducts USA, 9709 Brown Ln., Ste. E, Austin, TX 78754, 512/832-0335, 800/622-3475.

Mass Micro Systems, 3250 Jay St., Santa Clara, CA 95054, 408/988-1200, 800/253-8900.

Microtech Peripherals, Inc., 29 Business Park Dr., Branford, CT 06405, 203/488-8993, 800/325-1895.

Network Specialties, 1485 Bayshore Blvd., San Francisco, CA 94124, 415/467-8411.

Novy Systems, Inc., 69 Ravenwood Ct., Ormond Beach, FL 32074, 904/427-2358.

Open Mac Enterprises, 2280 Bates Ave., Ste. J, Concord, CA 94520, 415/682-0440.

Peripheral Land, Inc., 47800 Westinghouse Dr., Fremont, CA 94538, 415/657-2211.

Radius, Inc., 404 E. Plumeria Dr., San Jose, CA 95134, 408/434-1010.

Relax Technology, Inc., 3101 Whipple Rd., Union City, CA 94587, 415/471-6112, 800/848-1313.

Ryad, 2521-F N. Grand Ave. #950, Santa Ana, CA 92701, 714/558-0662.

Spectra Micro Development, P.O. Box 41795, Tucson, AZ 85717, 602/884-7402.

SuperMac Technology, 295 N. Bernardo Ave., Mountain View, CA 94043, 415/964-8884.

Total Systems Integration, 99 W. Tenth Ave. #333, Eugene, OR 97401, 503/345-7395, 800/874-2288.

Warp Nine Engineering, Inc., 1751 W. County Rd. B #107, Saint Paul, MN 55113, 612/426-9769, 800/654-5294.

## *Pages 148 to 153*
*Live and in Color*

**Modern Artist**
Computer Friends, Inc., 14250 N.W. Science Park Dr., Portland, OR 97229, 503/626-2291. 1MB min. memory; requires Mac II; hard disk recommended. $199.

**PixelPaint**
Version 1.0. SuperMac Software, 295 N. Bernardo Ave., Mountain View, CA 94043, 415/964-9694. 1MB min. memory; requires Mac II, 8-bit video card, and two drives; hard disk and 2MB RAM recommended. $495.

**SuperChroma**
Computer Friends, Inc. For address see *Modern Artist.* 512K min. memory. $1500; Enhanced Video Option $1500, Hi-Resolution Monitor $650.

**The Shinko Color Printer**
Computer Friends, Inc., For address see *Modern Artist.* 512K min. memory; requires SuperChroma for 512K, Plus, or SE, or parallel interface card for Mac II. CHC335 $4500, CHC65 $8990.

## *Pages 154 to 163*
*Just Write*

**FullWrite Professional**
Version 1.0. Ann Arbor Softworks, Inc., 2393 Teller Rd. #106, Newbury Park, CA 91320, 805/375-1467. 1MB min. memory; requires external disk drive; hard disk recommended. $295.

**InAWord**
Version 1.0. Paragon Concepts, Inc., 4954 Sun Valley Rd., Del Mar, CA 92014, 619/481-1477, 800/922-2993. 512K min. memory; 1MB recommended. List price to be announced.

*(continues)*

## Where to Buy

**Laser Author**
Version 1.1. Firebird Licensees, Inc., P.O. Box 49, Ramsey, NJ 07446, 201/444-5700. 512K min. memory. $199.

**MacWrite**
Version 4.6. Claris Corp., 440 Clyde Ave., Mountain View, CA 94040, 415/960-1500. 512K min. memory. $125.

**Microsoft Word**
Version 3.01. Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717, 206/882-8080, 800/426-9400. 512K min. memory; requires 800K of drive storage; Mac Plus with external drive recommended. $395.

**Microsoft Works**
Version 1.1. Microsoft Corp. For address see *Microsoft Word.* 512K min. memory; requires 800K of drive storage. $295.

**Microsoft Write**
Version 1.0. Microsoft Corp. For address see *Microsoft Word.* 512K min. memory; requires 800K of drive storage. $175.

**MindWrite**
Version 1.1. MindWork Software, 555C Heritage Harbor, Monterey, CA 93940-2483, 408/375-1531, 800/367-4334 (orders only). 512KE min. memory; Mac Plus with hard disk recommended. $295.

**WordPerfect for the Macintosh**
Version 1.0. WordPerfect Corp., 288 W. Center St., Orem, UT 84057, 801/227-5000. 512K min. memory; external drive or hard disk recommended. $395.

**WriteNow**
Version 1.0. T/Maker Co., 1973 Landings Dr., Mountain View, CA 94043, 415/962-0195. 128K min. memory. $175.

### *Pages 164 to 174*
*Workstation Choices*

**Domain Series 3000 Personal Workstation**
Apollo Computer, Inc., 330 Billerica Rd., Chelmsford, MA 01824, 617/256-6600. System price varies.

**Interleaf Publisher**
Version 1.0. Interleaf, Inc., 10 Canal Park, Cambridge, MA 02141, 617/577-9800. 5MB min. memory; requires Mac II and hard disk. $2495.

**Macintosh II**
Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014, 408/996-1010. System price varies.

**Sun-3/60G**
Sun Microsystems, Inc., 2550 Garcia Ave., Mountain View, CA 94043, 415/960-1300, 800/821-4643, 800/821-4642 in California. System price varies.

### *Pages 176 to 183*
*The Numbers Racket*

**Excellent Exchange**
Heizer Software, 1941 Oak Park Blvd. #30, Pleasant Hill, CA 94523, 415/943-7667. 512K min. memory; requires *Microsoft Excel.* $4 for catalog and demo/sample program.

**Jazz**
Version 1A. Lotus Development Corp., 55 Cambridge Pkwy., Cambridge, MA 02142, 617/577-8500. Key-disk copy protection; installs on hard disk. 512K min. memory; requires external drive, and adapter (available free from Lotus and bulletin boards) for System 4.1 and Finder 5.5. $395.


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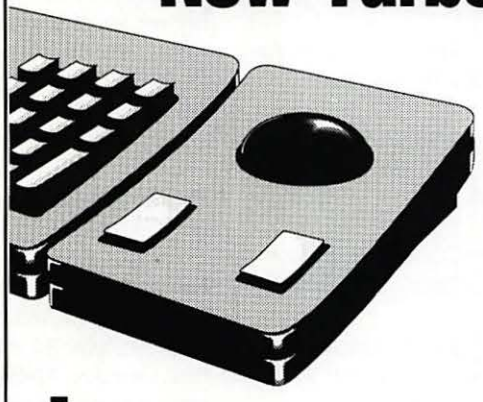

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| Digital Accuracy | **Yes** | Yes | Yes |
| Precision | **250 CPI** | 200 CPI | < 200 CPI |
| Dual ADB Ports | **Yes** | Yes | Yes |
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| MTTR** | **10 days** | ? | ? |
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**MacCalc**
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**Microsoft Excel**
Version 1.04. Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717, 206/882-8080, 800/426-9400. 512K min. memory; requires 800K drive storage; external drive recommended. $395.

**Microsoft Works**
Version 1.1. Microsoft Corp. For address see *Microsoft Excel*. 512K min. memory; requires 800K drive storage. $295.

**Trapeze**
Version 2.0. Data Tailor, Inc., 3113 S. University Dr., Fort Worth, TX 76109, 817/921-6083, 800/443-1022. 512K min. memory; requires external drive. $395.

**WorksXchange**
Heizer Software. For address see *Excellent Exchange*. 512K min. memory; requires *Microsoft Works*. $4 for catalog and demo/sample program.

## *Pages 188 to 193*
*Data Savers*

**DiskFit**
Version 1.2. SuperMac Software, 295 N. Bernardo Ave., Mountain View, CA 94043, 415/964-9694. 512K min. memory; requires hard disk. $74.95, also bundled with DataFrame hard disk.

**DS Backup**
Version 1.1. Design Software, 1275 W. Roosevelt Rd., West Chicago, IL 60185, 312/231-4540. 512K min. memory; requires hard disk. $69.95.

**Fastback for the Macintosh**
Version 1.01. Fifth Generation Systems, Inc., 1322 Bell Ave., Ste. 1A, Tustin, CA 92680, 714/259-0541, 800/225-2775. 512K min. memory. $129.

**FlashBack**
Version 1.6. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301, 818/991-6540, 800/544-7475 (orders only). 512K min. memory; requires hard disk. $59.95.

**Hard Disk Backup**
Version 1.27. FWB Software, 2040 Polk St. #215, San Francisco, CA 94109, 415/474-8055. 512K min. memory; requires hard disk. $54.95.

**HD Backup**
Version 2.0. PBI Software, Inc., 1163 Triton Dr., Foster City, CA 94404, 415/349-8765. 512K min. memory. $59.95, also free with Mac II.

**HFS Backup**
Version 2.02. Personal Computer Peripherals Corp., 6204 Benjamin Rd., Tampa, FL 33634, 813/884-3092, 800/622-2888. 512K min. memory; requires hard disk. $49.95.

**Network DiskFit**
Version 1.3. SuperMac Software. For address see DiskFit. 512K min. memory; requires hard disk. $395.

**Omni Backup**
Version 1.0. NuData Inc., 3206 Scott Blvd., Santa Clara, CA 95054, 408/727-1049, 800/832-8268. 1MB min. memory. $84.95.

## *Pages 194 to 199*
*Smooth Moves*

**Adobe Illustrator**
Version 1.11. Adobe Systems Inc., P.O. Box 7900, Mountain View, CA 94039-7900, 415/961-4400. Key-disk copy protection; unprotected disk

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**Art Browser**
Version 1.0. Public Domain Software by Adobe Systems, Inc. 1MB min. memory. Free (public domain software developed by Adobe Systems, Inc. but not supported).

**Art Grabber**
Spinnaker Software Corp., 1 Kendall Sq., Cambridge, MA 02139, 617/494-1200. Key-disk copy protection. 128K min. memory; MFS only; available with *Macromind Utility Disk (MUD)*. $49.95.

**Canvas**
Version 1.02. Deneba Software, 7855 N.W. 12th St. #202, Miami, FL 33126, 305/594-6965, 800/622-6827. 512KE min. memory. $195.

**CheapPaint**
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**Cricket Draw**
Version 1.1. Cricket Software, Inc., 30 Valley Stream Pkwy., Malvern, PA 19355, 215/251-9890, 800/345-8112. 512KE min. memory; external drive or LaserWriter recommended. $295.

**The Curator**
Version 1.0. Solutions International, Inc., 29 Main St., Montpelier, VT 05602, 802/229-0368. 512K min. memory. $139.95.

**FullPaint**
Version 1.0SE. Ann Arbor Softworks, Inc., 2393 Teller Rd. #106, Newbury Park, CA 91320, 805/375-1467. 512K min. memory. $99.95.

**Glue**
Version 1.05. Solutions International. For address see *The Curator*. 128K min. memory. $59.95.

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Version 1.0. Letraset USA, 40 Eisenhower Dr., Paramus, NJ 07653, 201/845-6100, 800/526-9703. 1MB min. memory; requires external drive; hard disk recommended. $495.

**JustText**
Version 1.1. Knowledge Engineering, GPO Box 2139, New York, NY 10116, 212/473-0095. 512K min. memory; external drive and LaserWriter recommended. $195.

**LaserFX**
Version 1.1. Postcraft International, Inc., 27811 Avenue Hopkins #6, Valencia, CA 91355, 805/257-1797. 512KE min. memory; LaserWriter recommended. $195.

**Mac3D**
Version 2.1. Challenger Software Corp., 18350 Kedzie Ave., Homewood, IL 60430, 312/957-3475. 512K min. memory; requires 800K of drive storage; 1600K of drive storage recommended. $249.

**MacDraft**
Version 1.2b. Innovative Data Design, Inc., 2280 Bates Ave., Ste. A, Concord, CA 94520, 415/680-6818. 512K min. memory; external drive recommended. $269.

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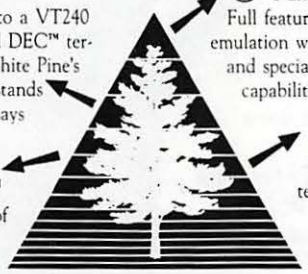

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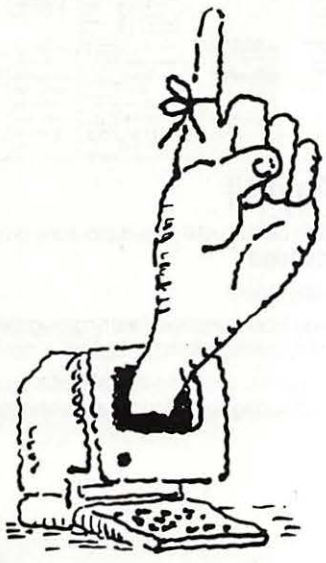

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**NewScrapbook**
Version 2.0. Shareware by Tim Wasko, 4832-49th Ave. NW, Calgary, Alberta, Canada, T3A 0R9. 512KE min. memory. Contribution requested.

**PageMaker**
Version 2.0a. Aldus Corp., 411 First Ave. S., #200, Seattle, WA 98104, 206/622-5500. 512K min. memory; requires hard disk for 512K, or 800K external drive for 512KE; Mac Plus with hard disk, Mac SE, or Mac II, PostScript printer recommended. $495.

**PictureBase**
Version 1.2. Symmetry Corp., 761 E. University Dr., Ste. C, Mesa, AZ 85203, 602/844-2199, 800/624-2485. 512K min. memory. $99.

**Pro3D**
Version 1.0. Enabling Technologies, Inc., 600 S. Dearborn St. #1304, Chicago, IL 60605, 312/427-0408. 512K min. memory. $349.

**Quark XPress**
Version 1.1. Quark Inc., 300 S. Jackson #100 , Denver, CO 80209, 303/934-2211. Key-disk copy protection; unprotected disk will be sent to registered owners. 512KE min. memory; requires external drive or hard disk; Mac Plus recommended. $695.

**ReadySetGo**
Version 4.0. Letraset USA. For address see *ImageStudio*. 512K min. memory; requires external drive for 512K; Mac Plus with external drive recommended. $495.

**Scoop**
Version 1.0. Target Software, Inc., 14206 S.W. 136th St., Miami, FL 33186, 305/252-0892, 800/622-5483. 512KE min. memory; latest System from Apple recommended. $495.

**SmartScrap and The Clipper**
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**SuperGlue**
Version 1.01. Solutions International. For address see *The Curator*. 512K min. memory. $89.95.

**SuperPaint**
Version 1.0p, Silicon Beach Software, Inc., P.O. Box 261430, San Diego, CA 92126, 619/695-6956. 512K min. memory. $149.95.

**WetPaint**
Version 1.1 for Art Roundup, version 1.6 for Pattern Mover. Dubl-Click Software, Inc., 18201 Gresham St., Northridge, CA 91325, 818/349-2758. 128K min. memory (512K required for Art Roundup); Mac Plus, and a paint program such as *FullPaint* or *MacPaint* recommended. $39 each volume, $59 for both.

### *Page 200*
*Typesetting on a Mac*

**TeXtures**
Version 1.0. Addison-Wesley Publishing Co., Inc., Jacob Way, Reading, MA 01867, 617/944-6795. 512K min. memory; requires external drive; printer and hard disk recommended. $495.*

### *Page 202*
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Qume Corp., 2350 Qume Dr., San Jose, CA 95139, 408/432-4000, 800/223-2479. 128K min. memory; requires AppleTalk. 2MB model $4795, 3MB model $5295.

### *Page 203*
*RAID on a Disk*

**TMON**
Version 2.8. ICOM Simulations, Inc., 648 S. Wheeling Rd., Wheeling, IL 60090, 312/520-4440. 512K min. memory. $149.95.*


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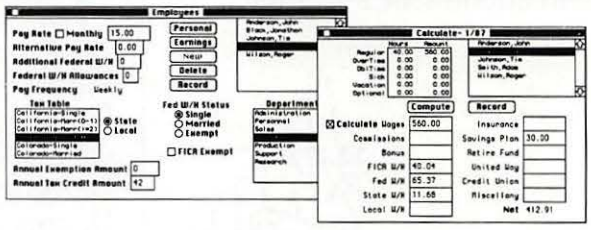

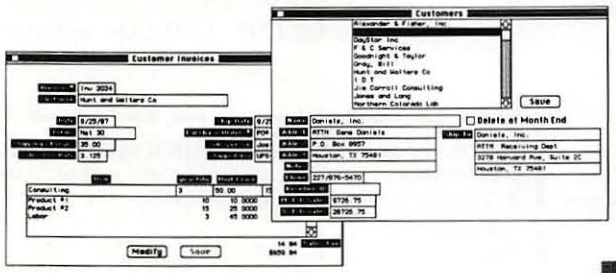

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### *Page 204*
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**Apple File Exchange**
Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014, 408/996-1010. 512KE min. memory; requires Apple PC 5.25 Drive, SE, or Mac II for MS-DOS-formatted disks. Bundled with System 5.0. Free with all new Macs, $49 for upgrade.*

**Apple PC 5.25 Drive**
Apple Computer, Inc. For address see *Apple File Exchange*. 1MB min. memory; requires SE or Mac II and PC Drive Card. $399.*

**DaynaFile**
Dayna Communications, Inc., 50 S. Main St., 5th Floor, Salt Lake City, UT 84144, 801/531-0203. 512KE min. memory; requires SCSI port for 512KE. From $595 to $1029.*

**Dayna Translation Software**
Dayna Communications, Inc. For address see Dayna Translation Software. 512KE min. memory; requires DaynaFile or MacCharlie. $95.*

### *Page 205*
*The Dungeon with a Difference*

**Quarterstaff**
Version 1.1. Simulated Environment Systems, 800 S. Pacific Coast Hwy. #8-331, Redondo Beach, CA 90277, 213/379-6742. 1MB min. memory. $49.95.

### *Page 206*
*Looking for the Right Word*

**Word Finder**
Version 1.0. Microlytics, Inc., 300 Main St., East Rochester, NY 14445, 716/377-0130, 800/828-6293 (orders only). 512K min. memory. $59.95.*

### *Page 207*
*Color Cutting*

**ColorCutter**
People's Publishing, Inc., 4222 Pleasantdale Rd., Atlanta, GA 30340, 404/449-7270. $72 for an 8½-by-11-inch four-color separation.*

**ColorHelper**
Version 1.0. People's Publishing, Inc. For address see ColorCutter. Works only with ColorCutter service. 1MB min. memory. Free. Available from CompuServe or GEnie.*

### *Page 207*
*Brain Gain for AI*

**MacBrain**
Version 1.1. Neuronics, Inc., 1 Kendall Square #2200, Cambridge, MA 02139, 617/577-1202. 1MB min. memory; Mac II, color screen, hard disk, and additional RAM recommended. $300.*

### *Page 209*
*Just the Stacks, Ma'am*

**HyperCard**
Version 1.01. Apple Computer, Inc., 20525 Mariani Ave., Cupertino, CA 95014, 408/996-1010. 1MB min. memory. $49 (free with all Macs purchased after August 11, 1987).

### *Page 210*
*The Enchantment of Puzzling*

**The Fool's Errand**
Version 1.1. Miles Computing, Inc., 7741 Alabama Ave. #2, Canoga Park, CA 91304, 818/341-1411. 512K min. memory; requires external drive for 512K. $49.95.*

### *Page 211*
*Mac to Go*

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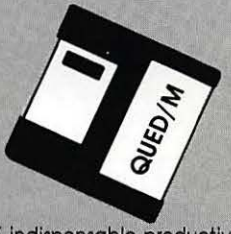


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**The CIS Navigator**
Version 1.27. Leptonic Systems Co., 405 Tarrytown Rd. #145, White Plains, NY 10607, 914/682-0377. 512K min. memory; requires modem. Shareware $35 without disk, $40 with disk.*

### *Page 213*
*Out of the Past*

**Family Roots**
Version 1.2. Quinsept, Inc., P.O. Box 216, Lexington, MA 02173, 617/641-2930. 512K min. memory. $72.50, $22.50 per update.*

### *Page 214*
*Away with Words*

**Icon-It**
Version 1.0. Olduvai Software, Inc., 7520 Red Rd., Ste. A, South Miami, FL 33143, 305/665-4665. 512KE min. memory. $79.95.*

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*Number, Please*

**QuickDEX**
Version 1.4. Greene Inc., 15 Via Chualar, Monterey, CA 93940, 408/375-0910. 512K min. memory. $35.*

### *Page 216*
*Pascal for the Masses*

**Turbo Pascal**
Version 1.0. Borland International, 4585 Scotts Valley Dr., Scotts Valley, CA 95066, 408/438-8400, 800/255-8008, 800/742-1133 in California. 512K min. memory; external drive recommended. $99.95.

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### *Page 216*
*The Contender*

**Macintosh Programmer's Workshop**
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### *Page 218*
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| | MacCustomer Price* | Price |
|---|---|---|
| Hard Disk Drives: | | |
| Magic20meg | 529.00 | 549.00 |
| Magic30meg | 659.00 | 699.00 |
| Magic40meg | 759.00 | 799.00 |
| Magic91meg | 1299.00 | 1399.00 |
| Magic150meg | 1750.00 | 1950.00 |
| Everex EMAC-20 | 475.00 | 575.00 |
| Rodime 20 Plus | 585.00 | 749.00 |
| ProApp20S | 549.00 | 649.00 |
| 60MB Tape Backup | 659.00 | 699.00 |
| Abaton Scanner | 1295.00 | 1495.00 |
| Thunderscan 4.0 | 174.00 | 199.00 |
| Mac Tablet 6X9 | 301.85 | 327.00 |
| System Saver | 63.50 | 75.00 |
| MacFan | 68.00 | 93.00 |
| Turbo Mouse (+, SE) | 77.09 | 87.00 |
| Abaton ProPoint | 95.00 | 125.00 |
| A+ Optical Mouse | 61.08 | 89.00 |
| 800K Drive | 165.00 | 199.00 |
| Modems: | | |
| MagicModem 1200 | 89.50 | 129.00 |
| 2400 Baud Modem | 162.00 | 199.00 |
| Hayes/Zenith 2400 | 162.00 | 199.00 |
| Xerox Screen | 1329.00 | 1549.00 |
| Qume LaserPrinter | 3550.00 | 3850.00 |

## UPGRADES

| | MacCustomer Price* | Price |
|---|---|---|
| 128K-512K | 110.00 | 119.00 |
| 128K-1024K | 240.00 | 249.00 |
| 128K-2048K | 549.00 | 599.00 |
| 512K-1024K | 150.00 | 159.00 |
| 512K-2048K | 389.00 | 399.00 |
| 1Meg SIMMs | 209.00 | 219.00 |
| SCSI Port | 69.00 | 75.00 |
| Dove Upgrades | call | call |

## DISK/RIBBONS & ACCESSORIES

| | | |
|---|---|---|
| Sony DS Boxed | 14.10 | 16.80 |
| Sony SS Boxed | 9.60 | 11.60 |
| Sony DS Bulk | 1.14 | 1.34 |
| Sony SS Bulk | ..84 | .99 |
| MacDisk DS | .93 | 1.25 |
| Black Ribbons | 2.40 | 3.00 |
| Colored Ribbons | 2.95 | 5.00 |
| Multicolored Rib. | 9.00 | 12.00 |
| MacPlus Bag | 38.50 | 59.00 |
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| Macintosh Bible | 12.50 | 18.00 |
| MAGIC Mouse Pad | 7.50 | 10.95 |

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## *Page 219*
*A Database Construction Kit*

**Inside Out**
Version 1.0. Shana Enterprises, Inc., 9704 54th Ave. #200, Edmonton, Alberta, Canada, T6E 0A9, 403/438-6548. Min. memory depends on language; disk and Mac Plus recommended. $395 for tools to create single-user programs, $595 to create multiuser programs, $200 annual license fee.

## *Pages 253 to 260*
*Getting Started with Desktop Publishing*

**FullWrite Professional**
Version 1.0. Ann Arbor Softworks, Inc., 2393 Teller Rd. #106, Newbury Park, CA 91320, 805/375-1467. 1MB min. memory; requires external disk drive; hard disk recommended. $295.

**JustText**
Version 1.1. Knowledge Engineering, GPO Box 2139, New York, NY 10116, 212/473-0095. 512K min. memory; external drive and LaserWriter recommended. $195.

**MacTeX**
Version 2.0. FTL Systems Inc., 234 Eglinton Ave. E. #205, Toronto, Ontario, Canada, M4P 1K5, 416/487-2142. 1MB min. memory; requires external drive and PostScript printer; hard disk recommended. $750.

**MacWrite**
Version 4.6. Claris Corp., 440 Clyde Ave., Mountain View, CA 94040, 415/960-1500. 512K min. memory. $125.

**Microsoft Word**
Version 3.01. Microsoft Corp., 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717, 206/882-8080, 800/426-9400. 512K min. memory; requires 800K of drive storage; Mac Plus with external drive recommended. $395.

**MS-300A**
Microtek Lab., Inc., 16901 S. Western Ave., Gardena, CA 90247, 213/321-2121, 800/654-4160. 512K min. memory. $2495.

**Ragtime 2**
Version 2. Orange Micro, Inc., 1400 N. Lakeview Ave., Anaheim, CA 92807, 714/779-2772, 800/223-8029. 512KE min. memory; hard disk recommended. $395.

**ReadySetGo**
Version 4.0. Letraset USA, 40 Eisenhower Dr., Paramus, NJ 07653, 201/845-6100, 800/526-9703. 512K min. memory; requires external drive for 512K; Mac Plus with external drive recommended. $495.

**Scoop**
Version 1.0. Target Software, Inc., 14206 S.W. 136th St., Miami, FL 33186, 305/252-0892, 800/622-5483. 512KE min. memory; latest System from Apple recommended. $495.

**ThunderScan**
Thunderware, Inc., 21 Orinda Way, Orinda, CA 94563, 415/254-6581. 512K min. memory; requires ImageWriter I or II; hard disk or 1MB or more RAM recommended. $249.

**WordPerfect for the Macintosh**
Version 1.0. WordPerfect Corp., 288 W. Center St., Orem, UT 84057, 801/227-5000. 512K min. memory; external drive or hard disk recommended. $395.


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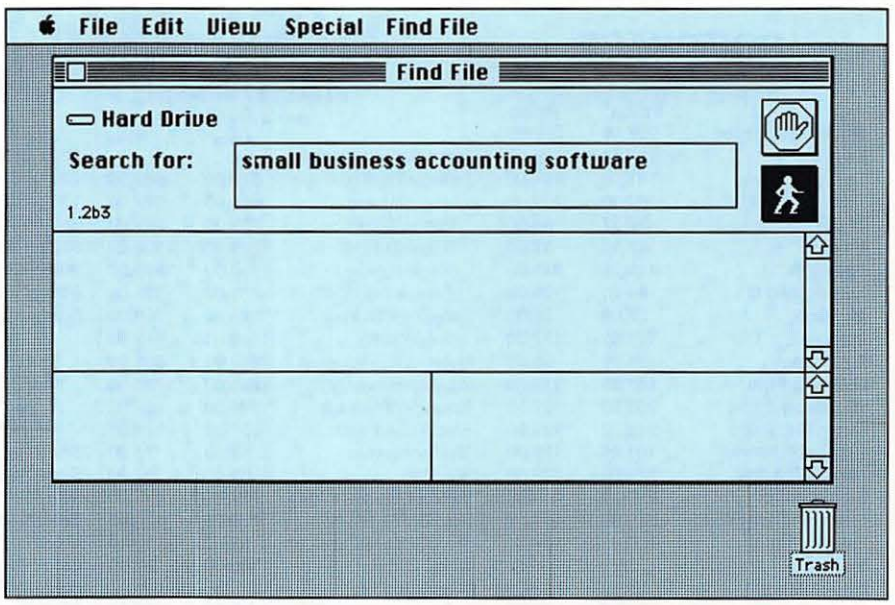


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## *Pages 275 to 289*
*Insights on FileMaker Plus*

**FileMaker Plus**
Version 2.1. Nashoba Systems, Inc., 151 Triton Dr., Ste. A, Foster City, CA 94404, 415/578-1970. 512K min. memory; 1600K of drive storage recommended. $295.

**The FileMaker Report**
Elk Horn Publishing, P.O. Box 397, Cupertino, CA 95015, 408/946-1767. $44/10 issues.

**MakeRecords**
Version 1.0. Acropolis Software, 25258 Cabot Rd. #120, Laguna Hills, CA 92653, 714/768-8490. 512K min. memory; requires *FileMaker Plus*. $39.95.

## *Pages 291 to 304*
*Mac Business Tools*

**4th Dimension**
Version 1.0. Acius, Inc., 20300 Stevens Creek Blvd. #495, Cupertino, CA 95014, 408/252-4444. 1MB min. memory; hard disk recommended. $695.

**Adobe Illustrator**
Version 1.11. Adobe Systems Inc., P.O. Box 7900, Mountain View, CA 94039-7900, 415/961-4400. Key-disk copy protection; unprotected disk will be sent to registered owners. 1MB min. memory; scanning device recommended. $495.

**Cricket Draw**
Version 1.1. Cricket Software, Inc., 30 Valley Stream Pkwy., Malvern, PA 19355, 215/251-9890, 800/345-8112. 512KE min. memory; external drive and LaserWriter recommended. $295.

**Fast Forms**
Version 1.1. Shana Enterprises, Inc., 9704 54th Ave. #200, Edmonton, Alberta, Canada, T6E 0A9, 403/438-6548. 512K min. memory; Mac Plus recommended. $149.

**PageMaker**
Version 2.0a. Aldus Corp., 411 First Ave. S. #200, Seattle, WA 98104, 206/622-5500. 512K min. memory; requires hard disk for 512K, or 800K external drive for 512KE; Mac Plus with hard disk, Mac SE, or Mac II; PostScript printer recommended. $495.

**Quark XPress**
Version 1.1. Quark Inc., 300 S. Jackson #100, Denver, CO 80209, 303/934-2211. Key-disk copy protection; unprotected disk will be sent to registered owners. 512KE min. memory; requires external drive or hard disk; Mac Plus recommended. $695.

**Ragtime 2**
Version 2. Orange Micro, Inc., 1400 N. Lakeview Ave., Anaheim, CA 92807, 714/779-2772, 800/223-8029. 512KE min. memory; hard disk recommended. $395.

**ReadySetGo**
Version 4.0. Letraset USA, 40 Eisenhower Dr., Paramus, NJ 07653, 201/845-6100, 800/526-9703. 512K min. memory; requires external drive for 512K; Mac Plus with external drive recommended. $495.

**TrueForm**
Version 1.0. Spectrum Digital Systems, Inc., 2702 International Ln. #112, Madison, WI 53704-3112, 608/244-4300, 800/541-6661. 512KE min. memory; requires external drive; hard disk and scanner recommended. $495. □

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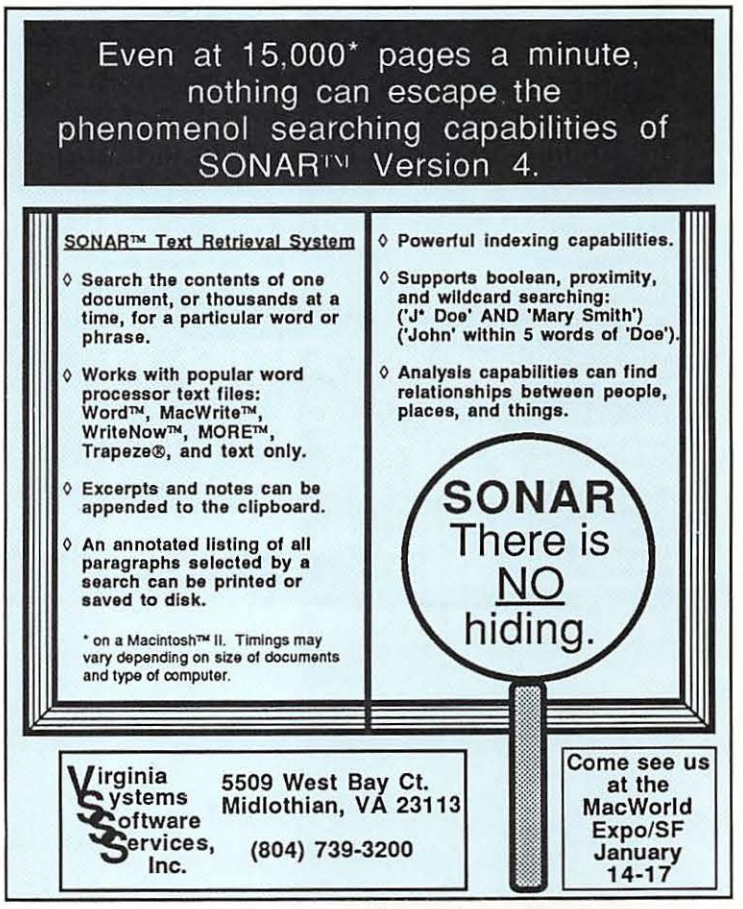


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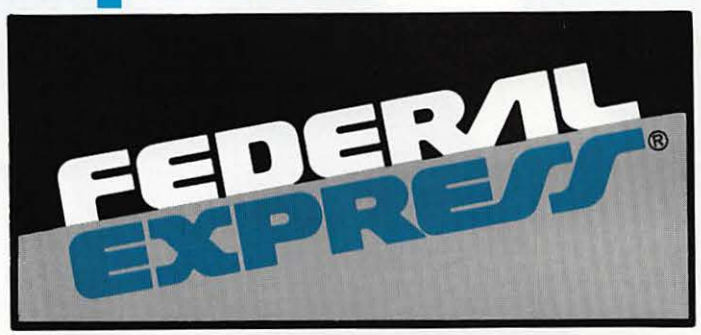


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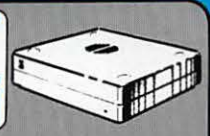

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• Organize Mac components for easy access, w/padded interior compartments.
• Tough Cordura® & resilient foam padding for protection.
• Quality material & carefully crafted construction–guaranteed.
• Ask about our ImageWriter II case.
• Call your local dealer today! For the dealer nearest you, call us or write. Dealer inquiries invited.
*West Ridge Designs, 305 N.W. 12th Ave., Portland, OR 97209, 503/248-0053*

**Softside Computer Cases**

Custom-designed to fit the Apple family of computers. All cases made in USA from 1000 Denier Cordura in choice of 8 colors, with ⅜" soft foam padding, ⅝" shock absorbent pad. Storage pockets & accessory pouch inside case. Padded hand grips & large, adjustable nylon shoulder strap w/pad. All cases exceed Eastman Kodak drop & stress standards.
*Ke-Lor, Inc., 948 College St., South Bend, IN 46628, 219/289-7886*

### ○ *Cables*

**Mac Lock/Mac Cables**

Mac Lock, finest security kit for Mac +, Mac SE, Mac II, secures Mac, keyboard, mouse, 2nd drive, modem, & printer. Attractive red vinyl-covered steel 3/16" cables. Lock included. No tools req. $-back guarantee. Also, all IBM, Apple $49.95. Mac Cables provide any length custom cables for Mac/+ (incl. keyboard) or almost any computer need. $20 & up.
*Mac Products, 20231 San Gabriel Valley Dr., Walnut, CA 91789, 714/595-4838*

### ○ *Hardware*

**MACOPENER™**

The finest one-piece tool to open the Macintosh case. Do your own upgrades, installations, adjustments, and repairs. No moving parts. One year warranty, parts and workmanship. Suggested list $19.95 + $3 shipping and handling. Dealer inquiries welcome.
*Central Products Corp., 2211 Norfolk #518, Houston, TX 77098, 713/529-1080*

**Keypad/Trackball**

The Numeric Ease: Upgrade your 512K/128K w/a 22 station, full scale, full function numeric keypad. Includes cursor keys & direct function keys, such as +, −, ×, ÷, & =. List: $59. The Numeric Turbo: A track ball cursor controller combined w/Numeric Ease. List: $169. Dealer inquiries welcome.
*Cambridge Automation, Inc., 20230 State Rd., Cerritos, CA 90701. Orders/Info: 800/345-8666 or 800/826- 9214 in CA.*

### ○ *Mouse Pads*

**Co. Logo Specialist**

Grey, Green & Red Pads
Size: 9" × 8" × ⅜"

| | |
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| • 12 pads | $9.50 |
| • 72 pads | $7.90 |
| • 144 pads | $6.70 |
| • 500 pads | $6.30 |
| • 1000 pads | $6.10 |

ENTIRE pad imprintable. GUARANTEED to last. MULTI-COLOR jobs OK. SAMPLES w/logo $12.50.
*Computer Expressions, 3833 Chestnut Street, Philadelphia, PA 19104, 800/443-8278*

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**LASEREDGE™ Paper/Film**

Get high resolution from plain paper laser printers and color plotters. LASEREDGE™ high resolution papers/films are waxable for paste-up. The bright white background, denser image, and finer line edge allows enhanced capability for 300 dpi to reproduce on camera. Call or write for samples today. MC/Visa accepted.
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**LaserWriter Toner Recharge**

Don't throw out empty toner cartridges. Sell them to us. Cartridge $6.50, cleaner $3, & box + packing $.50. • PRINTERS: Apple LaserWriter, HP & more • COPIERS: Canon PC models • BUY OUR RECHARGED CARTRIDGES $40 ($50 w/o), Blu/Brn $60 ($70 w/o). We supply empty cartridge & felt cleaner. QC test sheet provided. Support available.
*Michlin Computer Consultants, Inc., Laser Cartridge Division, 3770 Plaza Dr. #1, Ann Arbor, MI 48108, 313/663-9800, 800/63-TONER, FAX 313/663-9862, TLX 98-1520*

**Laser Cartridge Recharge!**

$$$Save a lot of money recharging laser-printer toner cartridges for Hewlett-Packard LaserJets, Canon, Apple LaserWriter, Corona, QMS. Recharged cartridges are reconditioned to work like new but last 20% longer. Money-back guarantee. Send $40 per cartridge plus $3 s/h. Monthly discounts.
*Toner Technologies/Laser Systems, 7 North Main, P.O. Box 407, Kaysville, UT 84037, 801/544-3090*

**Recharge Dealerships!!**

Hot New Field! Recycle laser printer & copier toner cartridges. Join our network & make money now. Train at our location or at home. High profit, low overhead. Established company. Learn it right–no drill & fill! Factory-like recharge method. Receive tools, supplies, trade secrets, marketing strategy & technical support. Free call for information. See us at the Mac Expo Booth 2230.
*Laser Charge Co., 11782 Jollyville Rd., Austin, TX 78759, 800/223-8134 or call collect 512/335-8191*

**$10 For Your Cartridge**

We'll buy your empty Laser Printer/Canon PC Copier toner cartridges. $8/Cartridges + $2/cleaning wand. HP, Apple, QMS, Corona, & more.
• For greater value, have your cartridges factory reconditioned $44.95. Original performance guaranteed. 18 years experience recycling data processing supplies & equipment. Call for details!
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*Silicon Output Supplies, 41-11 149th St., Flushing, NY 11355. Order Hotline: 800/451-0890. NY/Customer Service: 718/358-7671*

**Cartridge Recharge East**

Finally a quality toner reconditioning service in the Northeast! Now laser printer users in NY, Phila, Baltimore & Wash DC can get quality & price without the wait. Our location in New Jersey cuts UPS roundtrip shipping time by a week or more! Our cartridges come w/a money back guarantee. Color available. Send $40 per cartridge plus $3 s/h. Monthly quantity discounts.
*LaserTone, 7C State Street, Glassboro, NJ 08028, 609/881-9595*

## ■ *Advertising*

### ○ *Mailing Lists*

**Macintosh Mailing Lists**

Macintosh user names & addresses on adhesive labels, mag tape, or as Mac files on diskettes. Over 133,000 names to choose from. Only 5¢ per name for one-time rental. No charge for selecting, sorting, key coding, media, or delivery. Choose any quantity. This extremely high-quality list is updated daily. Ask for our one-time rental agreement before sending payment.
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## ■ Consulting

### Custom Developer

Specializing in integrated systems for legal, medical, sales & corporate mgmt. communities. Macros, templates, custom applications developed using *4th Dimension, Document Modeler,™ Project Modeler,™ Red Ryder,™ Excel.™* Nationwide service through our 24 hr. BBS. Fixed price, T&E, or hourly contract negotiable.
*Generation IV, 3232 San Mateo NE #199, Albuquerque, NM 87110, 505/765-9666*

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### Mac One-Stop Service

We specialize in bundling hardware and software for desktop publishing, LAN, database management & for small business accounting applications. Authorized dealer for Odesta, Dayna, Centram & Mega Graphics. Call for free price list & appointment. Best service & competitive pricing.
*Pacific Prime Computer Products, 2612 Artesia Blvd. #B, Redondo Beach, CA 90278, 213/376-5820, FAX 213/871-2112*

## ○ Computer Insurance

### Safeware

Insure your computer. Safeware provides full replacement of hardware, media, and purchased software. As little as $39 a year provides comprehensive coverage. With our blanket coverage, no lists of equipment are needed. One phone call does it all! Call 8 a.m. to 10 p.m. EST (Sat. 9 to 5).
*Safeware, The Insurance Agency Inc., 2929 N. High St., P.O. Box 02211, Columbus, OH 43202, 800/848-3469 (national), 614/262-0559 (in Ohio)*

### Data Security Insurance

The "all risk" Personal Computer Policy from DSI includes essential coverage not available with other policies: protection against loss of data (even from accidental erasure), loss of custom programs, & fraud. As low as $35 a year. Coverage can be bound by telephone, 9 to 4 Mountain Time.
*Data Security Insurance, 4800 Riverbend Rd., P.O. Box 9003, Boulder, CO 80301, 303/442-0900, 800/822-0901*

## ■ Hardware

## ○ Accessories

### Mac-cessory™

Everex, the leader of PC add-ons has come to the Macintosh market with their EMAC series of hard drives, tape backup units, and modems.

| | |
|---|---|
| • EMAC- 20D | $579 |
| • EMAC- 40D | $995 |
| • EMAC- 60T | $839 |

I/O Design presents MacLuggage:

| | |
|---|---|
| Mac SE carrying case | $83.95 |
| MacPlus carrying case | $64.95 |

*Valley Computers, 16744 W. Park Circle, Chagrin Falls, OH 44022, 216/543-1952*

## ○ Bar Code

### Bar Code/Mag Card Readers

Bar code & mag stripe (credit card) readers for all Macintosh computers, easily connected on the keyboard circuit, requiring no additional program or port; simple but powerful code-39 bar-code printing program for ImageWriter & LaserWriter; magnetic encoder/verifier. GSA pricing available.
*TPS Electronics, 4047 Transport St., Palo Alto, CA 94303, 415/856-6833*

## ○ Desktop Presentations

### The *Moving* Mac Show!

New Macnifier™ LCD electronic transparency projects any Mac *in action* on largest screens and walls from a regular overhead projector. Easily show any programs or graphics at meetings, classrooms, & trade shows. Liquid quartz for crystal clarity. Models from $1495. Free catalog of exciting Mac video products.
*Comtrex Ltd., P.O. Box 1450 El Toro, CA 92630, free catalog 800/443-2751 x140, technical questions 714/855-6600*

## ○ Disk Compatibility

### Use Mac Disks on IBM PC

*MatchMaker* lets you plug any Macintosh external floppy drive into an IBM PC. Half-size card and software lets you copy to/from, view directory, initialize, or delete files on the Mac disk. Works with PCs, XTs, ATs & compatibles. The easy way to move info! $149. Visa/MC/COD/Checks.
*Micro Solutions Computer Products, 132 W. Lincoln Hwy., DeKalb, IL 60115, 815/756-3411*

### Transfer Files to IBM

*MatchMaker* card fits in PC/XT/AT; transfers any Mac file to IBM and back. Simply plug your external Mac drive and *MatchMaker* into an IBM. $139 + $3 s/h.
*MatchPoint* card fits in PC/XT/AT; transfers Apple DOS, SOS, CP/M and ProDOS files to IBM and back. The IBM must have 5¼" 360K drive. $185 + $3 s/h.
*Blue Heron, 1108 S. Second St., DeKalb, IL 60115, 815/758-2355*

## ○ Hard Disk/SCSI

### YOUR MAC SOURCE

For all your Mac needs from hard disk drives, software, peripherals, Mac cases, books, networking and consulting. Desktop publishing typesetting and graphic design. Manuals, catalogs, newsletters, & brochures. Call us today!
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*Dafax Processing Corp., 14 North Drive, Malba, NY 11357, 800/323-1751 (orders & info.), 215/574-0357 (in PA)*

## ○ Memory Upgrade

### Memory Enhancements

Upgrade your Mac to 512K, 1024K, or 2048K of contiguous memory. SCSI port & fans available. Factory flow-solder techniques used for high reliability. 120-day warranty. Local 20-minute installation or mail order. Dealer inquiries welcome. Call for pricing and information.
*Ehman Engineering, 115 Apache Dr., Evanston, WY 82930, 800/257-1666*

### SIMM MODULES

• Bring your PLUS, SE & Mac II up to max memory. These SIMMS utilize surface mt. technology as chosen by Apple. • Specs: 1M DRAMS are 120NS, CMOS components selected for cooler operation & greater reliability.
• Also available 256K SIMMS & video RAM upgrades.
• All products unconditionally guaranteed.
• All inquiries welcome.
*CDC Enterprise, 2883 E. LaPalma, Anaheim, CA 92806, 714/630-4633*

### ONE MEGABYTE SIMMS

Upgrade your Mac Plus, Mac SE, or Mac II by 2 Megabytes for $575. These SIMM modules are the newest state-of-the-art plug-ins for Macs listed above. Low power eliminates the need for cooling devices. Using surface-mount technology these units should fit most future models for many years. We offer a limited lifetime guarantee against mfg. defects. (Dealers welcome.) Visa/MC accepted.
*D.M.S. (Data Memory Systems), Box 785, Middleton, MA 01949, 617/683-2325*

### RAM/ROM Upgrades

• 128K to 512KE $559 • 512K to Plus $569 • 128K to Plus $689 • SCSI Port $109 Apple ROM/800K Drive, *Free* internal Fan • Used Macs: 512K $799 • 512KE $999 • MacPlus $1325 Seikosha Printers $269, Ehman 800K External Drives $189, Internal Macintosh Fans $45
*Simmons Consulting (Disk Luggage) College Computer Dept., 5526 Pemberton St., Philadelphia, PA 19143, 215/471-9242 (until 10 pm)*

### PSI MAC PAC

$199 is all it costs for a 1MB memory upgrade. These surface mount, CMOS DRAMs use little power and eliminate the need for cooling devices. For Mac II:

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|---|---|
| 4 × 256K SIMM | $49.75 ea. |

For MacPlus, SE or II:

| | |
|---|---|
| 1M SIMM | $229 |
| 2 × 1M SIMM | $448 |
| 4 × 1M SIMM | $859 |

Dealer inquiries welcome. MC/Visa. For more info. call:
*PSI, 1609A S. Main St., San Jose, CA 95035, 408/942-8188, 800/MAC-1PAC*

### One Megabyte SIMMS

Upgrade your Mac Plus, SE, or Mac II by 2- to 4MB for $280 per meg with ACCUSIMMS, newest state-of-the-art CMOS surface-mount DRAMS, with lifetime guarantee. Assembled & tested in the USA. Quantities of 20 or more pcs. $225 ea. MC/Visa accepted freight prepaid.
*Data Memory Systems, Box 785, Middleton, MA 01949. Orders only 800/634-5463 ext. 320, Customer Service 617/683-2325*

## ○ *Networking*

### PhoneNET® System

The PhoneNET System creates an AppleTalk network w/convenience, added distance, & flexibility of telephone wire. PhoneNET supports AppleTalk & can use standard telephone cabling, even existing wiring. Components incl: PhoneNET PLUS Connectors, PhoneNET StarController w/StarCommand DA & PhoneNET Manager software, TrafficWatch network analysis package & PhoneNET CheckNET DA.
*Farallon Computing, 2150 Kittredge St., Berkeley, CA 94704, 415/849-2331*

### CompuNet Connector

LOW COST-HIGH QUALITY AppleTalk PhoneNet™ compatible network connector. Uses standard telephone wire. No special hardware required for 3000 ft. AppleTalk networks. $24.95 retail. SCSI Cables 25-50 & 50-50 UL. $24.95 retail. Dealer inquiries welcome.
*Trimar USA Inc., 236 W. 15th St., New York, NY 10011, 800/872-4454, 212/645-7008*

### Ethernet for the Mac

*Kinetics* provides Ethernet hardware and software for all Macintosh computers. These products include:
- FastPath: An AppleTalk- Ethernet gateway
- EtherSC: A SCSI-Ethernet controller
- EtherPort SE: An internal Ethernet option card for the Macintosh SE

AppleTalk and TCP/IP software is supported.
*Kinetics, Inc., 2500 Camino Diablo, Walnut Creek, CA 94596, 415/947-0998*

## ○ *Sound*

### MacRecorder™

MacRecorder records *real* sound into your Mac. Simple to use. Hold it in your hand & speak into the built-in microphone, or record directly from your TV or stereo. Package incl.: *HyperSound™* stackware lets you record & work w/sound from within HyperCard. *AudioFile™* records sound, then lets you edit & save file in a variety of formats including *HyperCard,™ StudioSession,™ VideoWorks™* & *Beep INITs.*
*Farallon Computing, 2150 Kittredge St., Berkeley, CA 94704, 415/849-2331*

## ○ *Video*

### MacMonitors/Projectors

- Does your Mac need to be seen in the boardroom, classroom, trade show midway? Big-screen (17" to 23"), high res color or monochrome w/anti-glare & vari scan, from $1,095.
- Projector systems for the ultimate in Mac-impact, from $3,895.
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- Dealer inquiries welcome.

*National Television Systems Co., 2113 Wells Branch Parkway, Suite 6100, Austin, TX 78728, 800/777-3000, 512/251-1392*

### Mac-LCD/Memory Module

Quit dragging your computer around from meeting to meeting. Now you can down load up to 75 screens to your LCD for the ultimate in presentations. The following is included.
- Chip-On-Glass LCD Panel for Mac 512K, Plus, SE, II, IBM plus & many other systems.
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*Saxet Sales, Inc., 17610 Midway Rd., #134-351, Dallas, TX 75252, 214/733-1711*

# ■ *MIDI*

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We have designed MAC based system for headline superstars and 1st time users. We offer:
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# ■ *Services*

## ○ *Data Conversion*

### Tape/Disk Conversions

Conversion services for your Macintosh, to or from over 1,000 computer systems:
- Mag tapes
- Microcomputers
- Word Processors
- Typesetters

Our conversion capabilities include to or from 3½-inch, 5¼- inch, and 8-inch disks & mag tapes.
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### MacTypeNet™

Mac/PC typesetting. Disk or modem. 300-dot LaserWriter™ output; 635-, 1270-, or 2540-line Linotype™ L300P output. Composition, page makeup, printing/bindery services. Hardware/software sales, services, and support; beginning and advanced training and seminars for Macintosh, PC, and Linotype 100/300 users.
*MacTypeNet,™ P.O. Box 52188, Livonia, MI 48152-0188, 313/477-2733*

### Laser Printing Services

LaserWriter (300-dpi)/Linotype L100 (1270-dpi) output of your Mac/IBM files. Disk or modem. 24 hr. service. Linotype $7 per page ($3.50 volume discount). LaserWriter $.50 per pg. Desktop publishing specialists in consulting & design services. Hardware/software sales. Offset printing & bindery services available.
Rent IBM/Mac $5 hr. Adobe font dealer. Check our low price.
*Laser Printing Services, 26058 W. 12-Mile Rd., Southfield, MI 48034, 313/356-1004 (MI), 800/722- 3475 (Nat'l.) Modem: 313/356- 3186*

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Professional-quality file output service at competitive prices. Mac or IBM, via disk or modem to our LaserWriter or Linotype. Same-day service. We can also keyboard your copy, from a letterhead to a full-length novel. Also available: complete darkroom services and platemaking for your printer. Write or call toll free:
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Software duplication also for 3.5" 2 MB, 5.25", & ¼" cartridge tape. Authorized Distributor for Trace/Ghostwriter Disk Duplication Equipment. Quality, Performance and Value. Your one source for complete SOFTWARE PACKAGING, Custom Printed labels, binders, manuals.
*West Coast Telecom, 10300 S.W. Nimbus #A, Portland, OR 97223, 503/620-1888*

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### NYC, Phila., NJ Designers

Desktop publishing doesn't have to look cheap! IBM or Mac files, disk or 24-hr. modem, for high-resolution L300 output through award-winning color printing, binding, & mailing. Impartial system advice, in-depth training, & support for major DTP Mac & IBM pkgs. +PostScript itself. Messenger service!
Ask for Kay Downs.
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Upload by disk or 24-hr. modem for 2540-line L300 output, with up to 30 font calls per page. Support all Adobe fonts, Mac & PC software including Ventura, Pagemaker, and most PC word processors. 24-hr. turnaround. Adobe type dealer; beginning and advanced training for Mac, L300 and PC users. Convention service.
*Lazer Graphix, 314 Las Vegas Blvd., Las Vegas, NV 89101, 800/492-0020, 702/386-2626 (Voice), 702/384-6761 (Fax). (24 hr. modem on line)*

## ○ On-Line Info Service

### Telefolders

Telefolders is a national electronic information service for Mac users only. Our software lets your Mac & any speed modem access our public data base using only standard icons, windows, & pull-down menus. Browse, upload and download, with just a click of the mouse. No commands to learn, no typing to do. Over one-year old. $49.95 gets you a complete starter kit, access time included.
*Semaphore Corp., 207 Granada Dr., Aptos, CA 95003, 408/688-9200*

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# ■ Software

## ○ Accounting

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• CheckMark *Payroll* calculates all employer and employee taxes. Prints checks and W-2s. Modifiable tax tables. • *MultiLedger* consists of accounts payable, accounts receivable, general ledger, and inventory. Allows profit centers, budgeting, & previous year comparisons. • 60-day money back guarantee. Demos $15 each.
*CheckMark Software, Inc., 1520 E. Mulberry, #230, P.O. Box 860, Fort Collins, CO 80522, 800/426-2466 ext. 338*

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Accounting applications for *Microsoft Works®*. Prints checks, invoices & POs on pre-printed forms. 15 reports give you necessary totals to post to your general ledger. Accounts Receivable, Accounts Payable, Payroll, & Purchasing at $49.95 ea. All 4 at $169.
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NOT COPY PROTECTED.....$149.95
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*Personal Computer Peripherals Corp., 6204 Benjamin Rd., Tampa, FL 33634, 813/884-3092, 800/622-2888*

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## ○ Business Mgmt.

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• *Develop Your Business Plan:* 200-pg. workbook, 21 tables, 16 graphs,complete instructions: $69.95
• *Financial Forecasting:* Workbook, sample pro-forma models, macros, graphs, instructions: $49.95
• *Sales and Market Forecasting:* Workbook, sample models, macros, graphs, where to find information: $49.95
*Infoplan, Inc., 155 Forest Ave., Palo Alto, CA 94301, 415/325-3190*

## ○ Case Tools

### ER Database Design Tool

*ERVision* is a database design tool using Entity-Relationship diagrams. Complex diagrams can be hierarchically organized with links between levels shown in each window. Provides diagram layout, design reports, and ER design checks. One year of updates. $150. Visa or PO.
*Andyne Computing Limited, 544 Princess St. #202, Kingston, Ontario, Canada K7L 1C7, 613/548-4355*

## ○ ClipArt

### MAC-ART LIBRARY

Illustrate your ideas w/*MAC-ART LIBRARY!* 12 disks of professional *MacPaint* images:

- Animals
- Farm Life
- Geography
- Kitchen
- Sports
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- Buildings
- Flowers/Trees/ Plants
- Greeting Cards
- People
- Transportation
- Signs/Symbols/
- Borders

Sgl. disks $39.95. Full library $250. Sampler $49.95. $3 s/h. Other disks.
*CompuCRAFT, P.O. Box 3155, Englewood, CO 80155, 303/791-2077*

**Interesting Graphics**
Our skilled illustrator has produced 5 collections for your Mac: *Horror/Fantasy #1, Bytes of Fright, Dinosaur Bytes* (natural history), *Sky Bytes* (aerospace), and *Classic Sci Fi*. The collections contain a variety of images, each of which is carefully crafted. Each collection is $29.95 ($32.05 in CA).
*AAH Computer Graphics Productions, Box 4508, Santa Clara, CA 95054, 408/980-7363*

**ARTWARE Graphics Library**
Detailed commercial & presentation graphics created with *Adobe Illustrator*. Use with programs that import Encap. Postscript files. Pictorial index included. Use as is, or modify with *Illustrator*, $69.95 per disk. By subscription $49.95 per disk. Disk of the month club.
*Artware Systems Inc., 3741 Benson Dr., Raleigh, NC 27609, 919/872-6511, 800/426-3858*

**Judaic Clip Art**
*DavkaGraphics*–91 Jewish symbols and pictures. Also contains Hebrew fonts for MacPaint and FullPaint. $34.95. *DavkaGraphics II* All-new set of Judaic clip art. $34.95. To order, call toll free 800/621-8227. Major credit cards accepted. For FREE catalog of Hebrew/Judaic software for Mac, call or write:
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*3G Graphics, 11410 N.E. 124th St. #6155-A, Kirkland, WA 98034, 206/823-8198, 800/456-0234*

## ○ *Communications*

**Mac2624: HP CRT Emulator**
Lets your Mac emulate the HP2624, HP2392, and HP2394, reliably running all HP3000 software. Implements HP modes, parameters, keyboard features, and display characteristics within the Mac's mouse/menu/⌘-key environment. Ultrafast file transfer (with text and graphics conversion options) included $199.
*Tymlabs Corp., 211 E. Seventh St., Austin, TX 78701, 512/478-0611, Telex 755820*

**pcLINK™**
A complete Macintosh interconnect solution for VAX (VMS and ULTRIX) and UNIX systems. Provides terminal emulation (VT241, VT220, VT100), file-transfer, virtual-disk, and print-server functionality. Supports serial line, remote modem, AppleTalk, Ethernet, or Omninet communications media.
*Pacer Software, Inc., 7911 Herschel Ave., #402, La Jolla, CA 92037, 619/454-0565*

**Contact™**
Burroughs emulation. *Contact* software emulates TD/MT/ET terminals. Sophisticated data capture–all screen data can be used by spreadsheet, database, word processor ...CANDE & XMODEM file transfer. Fully *à la Mac* interface. Soft keys, multiple pages & addresses, password protection...Soon: full file-transfer capabilities, Sperry terminal emulation.
*Avenue Software, Inc., 1173 W. Charest Blvd., Quebec, QC, Canada G1N 2C9, 418/682-3088*

**TextTerm+Graphics**
New MultiFinder version supports background file transfers and provides fast DEC VT100 text emulation and Tektronix (4014, 4105) graphic emulation. Reverse scroll; transfer text, tables, graphics (Paint/Pict); high quality color printing/plotting; file shipping; editor for correcting/electronic mail; direct LaserWriter support. $195.
*Mesa Graphics, P.O. Box 600, Los Alamos, NM 87544 (505) 672-1998*

## ○ *Custom Programs*

**4D™ & HyperCard**
• MacSolutions Invoices™ is point-of-sale invoicing software for small business • Lenders Construction Services™ is software for construction lenders & contractors for job costing & analysis • Plant Encyclopedia™ is stackware for nurseries & landscape architects. Demos available. Also CMS & DataFrame HD's from $599 & $749. Visa/MC.
*MacSolutions, 241 12th St., Del Mar, CA 92014, 619/481-0479*

## ○ *Database Mgmt.*

**DB Master® for the Mac**
Special introductory offer: $59.95. Easy to learn and use. Database manager ideal for first-time user. Store, organize, retrieve & print info. High capacity, powerful, flexible, not copy protected. 30-day $-back guarantee. Call now or send check/MO/Visa/MC $59.95 + $5 s/h to:
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**Instant Data Access**
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*Greene, Inc., 15 Via Chualar, Monterey, CA 93940, 408/375-0910 Orders: 800/331-4321, 800/851-1986 (CA)*

## ○ *Data Acquisition*

**MacPacq**
The MacPacq transforms the Macintosh into a digitial oscilloscope, chart recorder & waveform generator. A complete data acquisition & control system. 8 channel A/D, 8 digital I/O, programmable gain, 64K RAM. Optically isolated, line or nicad powered. Runs remote and/or connected to Mac. Comprehensive software interface provides for powerful & flexible system. $995 complete.
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**Parameter Manager Plus™**
Designed for people who need to manage, analyze & graph time, date, or sample-based data. No macros or templates are needed to produce trend plots, strip charts, histograms, forecasts, parametric plots, statistics, correlation, and financial high-low charts. Plot up to 32,000 data points, 96" x 48" in size. Text import & "Calculated Parameters" $395. Complete Demo $10. MC/Visa.
*Rebus Development Corp., 651 River Oaks Parkway, San Jose, CA 95134, 408/263-2207. Orders: 800/654-5147, 800/247-4994 (CA)*

## ○ *Desktop Presentations*

**Prism Color 35mm Slides**
Prism Color Slide Software™ lets you create 256-color 35mm slides from *MacDraw* files. Use graphics from many other *MacDraw* compatible programs. Transfer slide files by modem to a professional imaging center. 2K resolution slides only $7 each. Slides in 24hrs-free delivery. Call for free samples.
*20/20 Data Systems, 7000 Cameron Rd., Austin, TX 78752, 512/454-2508*

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by Microspot prints multicolored graphics & text from most Macintosh software using the Imagewriter II. MacPalette will colorprint documents from *MacDraw, MacDraft, MiniCad, MacProject, MacWrite, JAZZ, Microsoft Chart, Word, Excel* etc. (not *MacPaint.*) It prints black as a true black instead of mixing a black. $69.
*CompServCo, 800 Freedom, Slidell, LA 70458, 800/272-5533 or 504/649-0484*

**QUED/M* Macro Editor**
Powerful text editor/database manager. Many convenience editing features: e.g., unlimited undos. Find files with key words, find/replace with wildcard characters, type or record macros, count lines, words, sentences, etc., extract any data from text files. Search through unopened files, etc. $119.
*Paragon Concepts, Inc., 4954 Sun Valley Rd., Del Mar, CA 92014, 619/481- 1477, 800/922-2993 (Nat'l.)*

## ○ *Educational*

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*Chariot Software Group, 3659 India St. #MD1, San Diego, CA 92103, 619/298-0202*

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Each title $39.95 MC/Visa/Chk. Write or call for a free catalog.
*Nordic Software, Inc. 3939 North 48th St., Lincoln, NE 68504, 800/228-0417, 402/466-6502*

### MacANATOMY

A complete electronic atlas of human anatomy in *MacPaint* document form. The drawings may be modified and merged into *MacWrite* documents using the Clipboard. Comprised of four volumes, available singly or as a collection.
*MacMedic Publications, Inc., 5805 Westheimer, Houston, TX 77057, 713/977-2655*

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Integrated learning program for children 2-6 yrs. Uses child's name in speech and pictures. Totally mouse driven interactive program with iconic interface. Covers alphabet training, time telling, counting skills, upper-lower case, and mystery door! 4-mice rating in *MacUser.* Great gift! MC/Visa $39.95.
*Ohm Software, 163 Richard Dr., Tiverton, RI 02878, 401/253-9354*

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Revolutionary Homework Tutor™ lets you do your Algebra homework or classwork on a Mac. Checks each step you enter, gives hints, poses practice problems, solves and explains examples, and prints completed homework. Easy editing, standard Mac interface, and too much more to tell. Send for free brochure.
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*InVenture, Inc., 555 DeHaro #330, San Francicso, CA 94107, 415/626-9986, 800/622-9986*

## ○ *Engineering*

### Digital Logic Design Aid

*DesignWorks* is an integrated schematic diagram & digital logic simulation pkg. for electronics engineers. Create, document & test circuit designs w/all the interactive graphics power of the Mac. • Supports 100's of standard logic devices, 7400, 4000, etc. plus user-defined devices & PLDs (w/the LPLC™ logic compiler.) • Logic & timing diagrams printed, plotted & saved as graphics files. • Net & component lists for documentation of PCB layout. *DesignWorks* $685 (US). *LPLC* $535 (US).
*Capilano Computing, #501-1168 Hamilton St., Vancouver, BC, Canada, V6B 2S2, 604/669- 6343*

### Civil & Structural

Fully integrated analysis programs for 2-D frames, trusses, beams: FRAME MAC, BEAM MAC, BEAM MAC II. Structure, moment, defl. diagrams, text & more. $145-$595. Demo available. New: MacCOGO for geometric & structural properties of shapes: $145. COGO MAC available 1/88 (traditional COGO). $-back guarantee.
*Compuneering, Inc., 113 McCabe Crescent, Thornhill, Ontario L4J 2S6, Canada, 416/738-4601*

### Graphics File Translator

Save time, save money. Don't scan, Don't redraw. Translate between DAF, IGES, MiniCAD, MacDraw, PICT and MS/pal on the Macintosh. Clipboard features takes graphics from engineering/archicture to desktop publishing. $795.
*Kandu Software Corp., P.O. Box 10102, Arlington, VA 22210-1102, 703/532- 0213*

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Macintosh-based absolute cross-assemblers & editor for MPUs:
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*Micro Dialects, Inc., Dept. MW, P.O. Box 30014, Cincinnati, OH 45230, 513/271-9100*

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*Joe Mcgee Consulting Engineer (Regis. P.E.), 1401 NW 105 Terrance, Oklahoma City, OK 73114, 405/751- 4275*

### End the Nightmare

*FaceIt*™ provides your programs with rapid access to DAs, file handling, text editing, picture handling, dialogs, printing and more. Consists of stand-alone CODE resources which can be put in any file and used by programs created with BASIC, C, FORTRAN, Pascal, and other compilers. $50 complete.
*FaceWare, 1310 N. Broadway, Urbana, IL 61801, 217/328-5842*

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## ○ *Entertainment*

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Now–9 real simulations: Rommel's DESERT WAR • MIDWAY or THE SOLOMONS (carrier actions) • BARBARIAN in Rome's West or EAGLES in the East • WESTERN CAMPAIGNS or ARMY OF NORTHERN VIRGINIA (Civil War) • NORWEGIAN SEA or U.S. invasion in RED STARS (US/Soviet clashes). Great for solitaire. $34.95 ea. game or $64.95 for 2. Req. 512K+.
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### Tactical Jet Fighter™

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Gain control of your finances with our award-winning record keeper & financial planner designed for the Macintosh™ with your needs in mind. Easy transaction entry. Print checks, many reports, & graphs. Transfer data to a text file for extra benefits from other programs such as *MacInTax.*™ New version 3.0 available Jan. 1st for $119.95 + s/h. Req. 512K.
*Survivor Software Ltd., 11222 La Cienega Blvd., #450, Inglewood, CA 90304, 213/410-9527*

### Strategic Planning Inc.

A comprehensive Financial Planning System developed by CFP's to cover all areas of financial concern and practice management for Financial Planners, Stockbrokers, & CPA's. Completely integrates *Omnis 3* & Microsoft *Excel*. Entirely updated to the current tax laws. $3,500. Multi-user, demo. and IBM compatible versions are available.
*Strategic Planning Systems Inc., 15233 Ventura Blvd. #708, Sherman Oaks, CA 91403, 818/784-6863*

## ○ *Fonts*

### Downloadable Laser Fonts

Specialized fonts for the LaserWriter. Classical Greek $85. Serif/sans serif for scientific texts $75. Font of 100 chemical structures $125 (with scientific text fonts $160). Polish serif or sans serif $85 each (4 styles). Serif small caps $40. Regular or Polish (4 styles). Modern Greek $85. MC/Visa. As mentioned in Feb. '87 issue.
*Allotype Typographics, 1600 Packard Rd. #5, Ann Arbor, MI 48104, 313/663-1989*

### Beverly Hills 1.5

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Distinctive, downloadable fonts feature legibility, good fit, kerning, old-style numerals. *Foreign:* Hebrew, Athina (Ancient & Modern Greek), Devanagari. *Book & Display:* MacSlab (square serif), Ambo, other fine type. *New!* Phonetic, OCR-A, LCD. $55-$125. Custom characters/fonts. Free brochure.
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### MacGene™ (version 2.8)

70% faster & 100% complete. Designed specifically for the Mac. One program for data entry, search, select, list & charting. Features: History, Hints, Mail-List, Family Tree, Statistics, Text, etc.
- LDS compatible
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*Star•Com Software Systems, Windsor Park East, 25 West 1480 North, Orem, UT 84057, 801/225-1480*

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### MacPerspective™

Allows architects, draftspeople, and artists to rapidly construct perspective drawings of houses, buildings, or other objects. Viewpoint can easily be changed. Drawings can be printer in any size up to 100 inches. Easy to learn and use. Fast, professional program with many features, thorough manual. $179.
*B. Knick Drafting, 313 Marlin Pl., Melbourne Beach, FL 32951, 305/727-8071*

### MGMStation–Prof. CAD

by Micro CAD/CAM, Inc. is a high powered CAD program for the Mac similar to AutoCAD. MGM boasts over 140 powerful functions including: *x-y* coordinate input, polar or digital data input, 100 power zoom accurate to 4 decimals, tangent drawing tools and much more! $799. Demo disk and/or VCR tape avail.
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by Diehl Graphsoft boasts 1000+ power zoom, symbol library, 40 layers, auto-dimensioning, double-line tool, clip/add/intersect polygons tools, object snap, fillet & trim-lines tools, object sizer & locator, 9 decimals accuracy, full 2-D & 3-D modes, etc. It reads *MacDraw* & *MacDraft* files. $495. Demo avail.
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### MacPlot & MacCAD

MacPlot by Microspot is a powerful plotter driver that will plot any object-oriented graphics produced on the Mac in up to 30 colors/pens. MacPlot supports over 50 plots, MacCAD is a series of 12 separate architectural & engineering template symbol libraries for use with *MacDraw, MacDraft, MiniCad,* etc.
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*Greg Brasel, P.O. Box 4274, Chesterfield, MO 63006, 314/256-3317*

### Sizer & Adjacency

*MacDraw* DAs add CAD power ($69 w/installer. See 3/87 *Macworld*):
- Size any object by typing in dimensions, accurate to 0.0001 or 1/64" in architectural scale. Uses *MacDraw's* rulers. Copy and paste values for easy labeling.
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*Johnson & Johnson Design/Build, 677 Grove St., Newton, MA 02162, 617/253-5965*

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Layout $1500, Schematic $700, Autorouter $700, full demo $25.
*Douglas Electronics, 718 Marina Blvd., San Leandro, CA 94577, 415/483-8770*

## ○ *Health*

### Nutritional Software

Take steps to eat more sensibly. Analyze diets for nutritional content (calories, sodium, etc.) *Nutri- Calc Plus*™ includes 32 nutrients, 1700+ foods (3000 avail.). Offers RDA Comparison, tracks histories, energy analysis. $225. *Nutri-Calc*™ analyzes 8 nutrients, 900+ foods. Plots progress, analyzes recipes. $95. Both have brand name & fast foods, NCP.
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*Casablanca Software, P.O. Box 214, Dept MWB12, Hicksville, OH 43526, 419/542-8145*

### MacRecorder™

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Create books from *HyperCard* stacks. *HyperBook Maker* automatically lays out your pages so they fold to make a flip-top book. Lets you print on both sides. You just fold once and staple. Works for full, half- or quarter-size cards; all or part of a stack. Also prints both sides of page for notebook formats. *HyperBook Maker:* $59.95 postpaid. MC/Visa.
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Tap *HyperCard*'s power in interactive Computer-Based Training (CBT) development. Two discs of stacks with ideas, routines, & training applications. Includes 60-page manual on using *Hypercard* for interactive CBT. Great for trainers, developers, entrepreneurs, and educators. Save weeks in creating interactive training stacks. Send check for $135 (payable to First Reference) to:
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*HyperSource, 2619 South 302nd St., Federal Way, WA 98003, 206/946-2011*

## ○ *Imports*

### Japanese Software
*E/G Word* (Ergosoft Inc.) is a Japanese word processor; can turn romaji sentences into kana & kanji. $399. Req. 512K. Also:
*E/G Bridges* $249. *SWEET JAM 3.0* (A & A Co. Ltd.) Input Japanese in major Mac application software, $200.
• *Japanese Clip-Art* Vol. 1 & 2, $79.95 ea.
• *Mac Calligraphy* simulates medium of ink & brush on paper $149.95. (Enzan Hoshigumi Co.)
*Qualitas Trading Co., 6907 Norfolk Rd., Berkeley, CA 94705, 415/848-8080*

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# Macworld Best-Sellers

## Business Software

| Months on chart | Last month | This month | | |
|---|---|---|---|---|
| 32 | 1 | 1 | **Microsoft Word** | *Microsoft* |
| 12 | 2 | 2 | **Microsoft Works** | *Microsoft* |
| 24 | 3 | 3 | **Microsoft Excel** | *Microsoft* |
| 20 | 4 | 4 | **PageMaker** | *Aldus* |
| 13 | – | 5 | **MacWrite** | *Apple Computer* |
| 10 | 5 | 6 | **SuperPaint** | *Silicon Beach Software* |
| 5 | 9 | 7 | **MacMoney** | *Survivor Software* |
| 2 | 8 | 8 | **Cricket Graph** | *Cricket Software* |
| 5 | 7 | 9 | **WriteNow for Macintosh** | *T/Maker* |
| 3 | – | 10 | **FileMaker Plus** | *Nashoba Systems* |

## Education Software

| Months on chart | Last month | This month | | |
|---|---|---|---|---|
| 16 | 1 | 1 | **Math Blaster** | *Davidson & Associates* |
| 14 | 2 | 2 | **Typing Tutor III** | *Simon & Schuster Computer Software* |
| 16 | 3 | 3 | **KidsTime** | *Great Wave Software* |
| 6 | – | 4 | **Early Games** | *Springboard Software* |
| 3 | 4 | 5 | **Speed Reader II** | *Davidson & Associates* |

## Entertainment Software

| Months on chart | Last month | This month | | |
|---|---|---|---|---|
| 12 | 2 | 1 | **Dark Castle** | *Silicon Beach Software* |
| 16 | 3 | 2 | **MacGolf** | *Practical Computer Applications* |
| 16 | 1 | 3 | **Flight Simulator** | *Microsoft* |
| 3 | 4 | 4 | **HardBall** | *Accolade* |
| 5 | 5 | 5 | **Ferrari Grand Prix** | *Bullseye Software* |

## Networking/Data Communications

| Months on chart | Last month | This month | | |
|---|---|---|---|---|
| 16 | 1 | 1 | **AppleTalk** | *Apple Computer* |
| 12 | 2 | 2 | **TOPS** | *TOPS* |
| 8 | 3 | 3 | **AppleShare** | *Apple Computer* |
| 15 | 4 | 4 | **MacServe** | *Infosphere* |
| 9 | – | 5 | **Apple Personal Modem** | *Apple Computer* |

## Hard Disks*

| Months on chart | Last month | This month | | |
|---|---|---|---|---|
| 12 | 1 | 1 | **Apple Hard Disk 20/20SC** | *Apple Computer* |
| 5 | 2 | 2 | **Macintosh Internal 20SC Hard Disk** | *Apple Computer* |
| 1 | – | 3 | **Macintosh Internal 40SC Hard Disk** | *Apple Computer* |
| 6 | 3 | 4 | **Rodime 20 Plus** | *Rodime Peripheral Systems Division* |
| 1 | – | 5 | **Apple Hard Disk 40SC** | *Apple Computer* |

## Add-in Boards

| Months on chart | Last month | This month | | |
|---|---|---|---|---|
| 3 | 3 | 1 | **Apple 2MB Memory Expansion Kit** | *Apple Computer* |
| 3 | 1 | 2 | **Apple 1MB Memory Expansion Kit** | *Apple Computer* |
| 3 | 2 | 3 | **Radius Accelerator** | *Radius* |
| 1 | – | 4 | **Video Board/Large Screen** | *Ryad* |
| 3 | 5 | 5 | **MacSnap Plus 2** | *Dove Computer* |

## Product Watch

Editors' choice:
Other recent products of particular interest.

**Digital Darkroom** *Silicon Beach*
bit-mapped to object-oriented graphics conversion program

**VideoWorks Interactive**
*MacroMind* interactive color animation program

*Source: Exclusive InfoCorp survey of more than one hundred twenty-five Macintosh retailers and selected mail-order suppliers. Covers sales during October 1987.*

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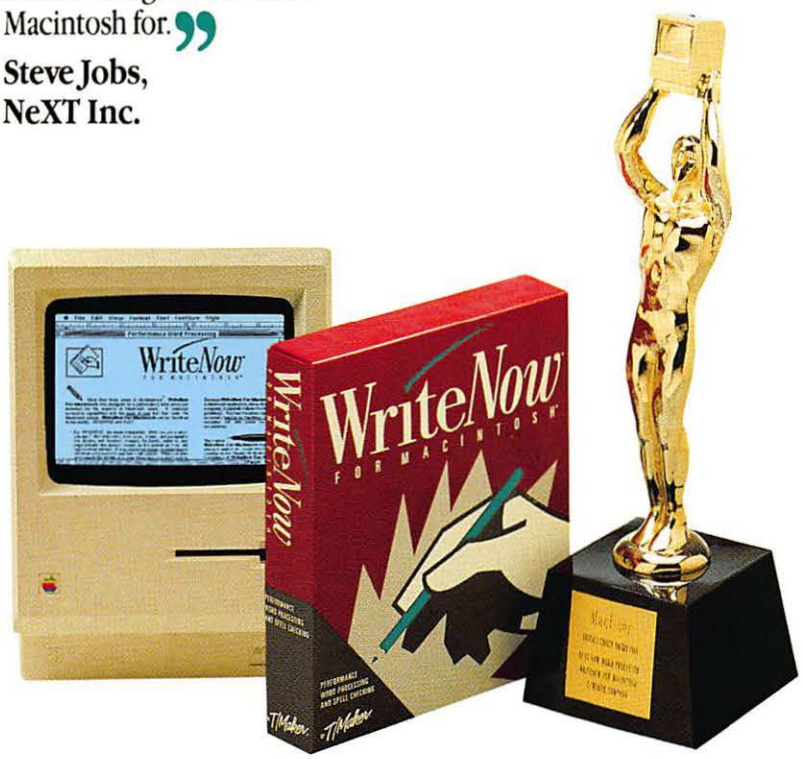


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**Dan Farber, MacWorld Magazine**

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**Vicky Jo Varner, The MACazine**

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